How Pennsy Cleans Lubricators

. . . page 34

Glass Bands Improve Armatures

. . . page 46

RAILWAY

LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN TIME-SAVER PUBLICATION DECEMBER 1959



COMP
EDITORIAL DEPT
UNIV MICROFILMS INC
313 N FIRST ST
ANN ARBOR MICH

FOUNDED
1832
AMERICA'S
OLDEST
TRADE PAPER

C&NW Starts Its 'Push-Pull' Service . . . page 22

Merry Christmas



W. H. MINER, INC. CHICAGO



SOLID!
Section of Roebel bar for 22,000 Volt, 76,000 KVA turbogenerator stator.

The outstanding insulation for high voltage coils

NECCOBOND...solid insulation bonded to the copper provides longer life, greater strength and stability

In NECCOBOND, National has developed a complete insulation system, using mica, glass and a special impregnant. Its particular advantages for high voltage coils are:

- Exceptional thermal stability.
- Optimum mechanical and electrical properties.
- High heat conductivity.

NECCOBOND is based on time-proven insulating materials – mica and glass. These are welded by a special impregnant into a tenaciously bonded, resilient, voidless insulation wall. A unique method of fabrication assures homogeneous insulation.

When replacing high voltage coils, investigate the long term savings with NECCOBOND. You'll find our advice impartial—we offer all types of insulation.

For more information, call National's Columbus Plant . . . HUdson 8-1131. Or call your nearby National field engineer.

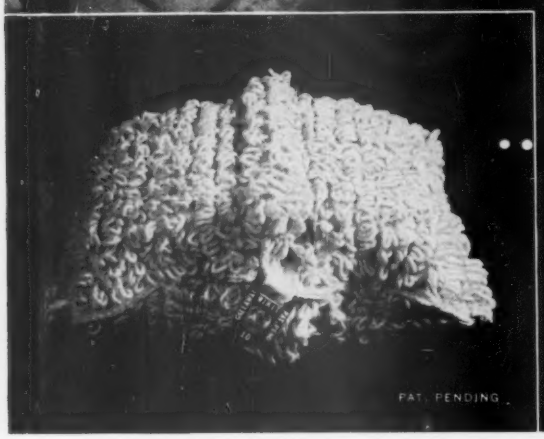
McGRAW EDISON

National Electric Coil

DIVISION OF McGRAW-EDISON COMPANY
COLUMBUS 16, OHIO

ELECTRICAL ENGINEERS • MANUFACTURERS OF ELECTRICAL COILS, INSULATION, LIFTING MAGNETS
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

from Callaway Mills–
WIKIT
journal lubricators



....with 4 exclusive features!

● **Specially Constructed Center Wick**—One-third of the pile fabric is in the center wick. If there is any oil in the box, WIKIT absorbs it!

● **"Loop Tite" Jacket**—Special construction, woven by a patented process, interlocks loop pile in the weave. Gives greater tensile strength . . . protection against glazing.

● **ABSORBenized®**—WIKIT jackets are specially treated—like famous Callaway bath towels—to assure greatest absorbency, faster wicking.

● **Specially Shaped**—WIKIT lubricates the entire journal . . . is shaped to oil end collar and fillet without exposing main body of lubricator to damage.

WIKIT absorbs and retains 5 pints of oil or more, depending upon size...after saturation and draining 3 hours. Provides continuous lubrication under toughest usage and all weather conditions. Nylon tape secures non-ferrous pull handles to lubricator ends . . . has tensile strength in excess of 500 pounds. Cores are quality neoprene foam . . . resistant to oil, heat, and compression set . . . no metallic parts except pull handles. WIKIT is made for all journal sizes . . . is realistically priced. See your nearest Sales Representative!



CALLAWAY MILLS, INC. • 295 Fifth Avenue, New York 16, N. Y.

Representatives: New York • Philadelphia • Cleveland • Chicago • St. Paul • San Francisco • San Antonio • Louisville • Montreal

RAILWAY
LOCO-
MOTIVES
AND
CARS

The Oldest Trade Paper
In the United States

December 1959—Vol. 133, No. 12

Editorial and Executive Offices:
30 Church Street, New York 7

C. L. Combes
Editor, New York

F. N. Houser
Managing Editor, New York

Norman E. Gillespie
Western Editor, Chicago

A. G. Oehler
Consulting Editor, New York

Lillian D. Milner
Editorial Assistant, New York

•

Robert G. Lewis
Publisher, New York
Duane C. Salisbury
Director of Sales, New York

•

BRANCH OFFICES: 79 West Monroe st., Chicago 3; 1081 National Press Bldg., Washington 4, D. C.; 1501 Euclid ave., Cleveland 15; 1336 Wilshire Blvd., Los Angeles 17; Suite 203, Carlton House, Pittsburgh 19; 214 Terminal Sales Bldg., Portland 5, Ore.; 244 California st., San Francisco 11; 3908 Lemmon ave., Dallas 19, Tex.

FOREIGN REPRESENTATIVES: Sibley-Field Publishing Company, Ltd. 8/9 Clerkenwell Green, London E. C. I. England; Georg J. Linder, Continental European Representative, (16) Frankfurt a. Main, Wittelsbacher Allee 60, West Germany.

•

Railway Locomotives and Cars is a member of the Audit Bureau of Circulation (A.B.C.) and is indexed by the Engineering Index Service. Printed in U.S.A.

Published monthly by the Simmons-Boardman Publishing Corporation, 10 W. 23rd St., Bayonne, N. J., with editorial and executive offices at 30 Church St., New York 7. James G. Lyne, Chairman of the Board; Arthur J. McGinnis, President and Treasurer; Duane C. Salisbury, Exec. Vice Pres.; George Dusenbury, Vice-Pres. and Editorial and Promotional Director; M. J. Figa, Vice Pres. and Director of Production.

•

CIRCULATION DEPARTMENT: **R. C. Van Ness, Director of Circulation, 30 Church st., New York 7.** Re-entry of second class privileges authorized at Newark, N. J., with additional second class privileges, Bristol, Conn. Subscription price to railroad employees only in U.S. possessions and Canada, $2 one year, $3 two years, payable in advance. Subscription price to railroad employees elsewhere, $8 per year. Single copies, 75¢. Address all subscriptions and correspondence concerning them to: Subscription Department, Railway Locomotives and Cars, Emmett st., Bristol, Conn. Changes of address should reach us three weeks in advance of the next issue date. Send old address with the new, enclosing, if possible, your address label. The Post Office will not forward copies unless you provide extra postage. Duplicate copies cannot be sent.

POSTMASTER—SEND FORM 3579 TO EMMETT ST., BRISTOL, CONN.

REPORT FOR DECEMBER

Open-Top Car Situation Serious

With shortages developing on some roads even before Supreme Court action brought an end to the steel strike, it is expected that hopper-car repairs will receive great emphasis during coming months. An early Great Lakes freeze-up could mean that railroads "may again be called upon to stage a mammoth movement of ore all the way from the Minnesota ranges to the great steel producing areas from Gary to Pittsburgh," according to AAR President Daniel P. Loomis. This could aggravate an already serious open-top car situation.

Normal service demands for hopper cars in December are expected to equal levels of 1957 when there were 38,700 more servicable hoppers, the AAR Car Service Division warned. The gondola situation is "almost identical," and the Division foresees possible shortages of covered hoppers, box cars and flats. Bad-order ratio for the entire U.S. car fleet was 8.5 percent on October 1, 1959, as compared to 8.4 per cent a year earlier.

As the strike was brought to an end, the roads serving major steel producing centers stepped up the pace of their equipment maintenance activities. Chesapeake & Ohio, Norfolk & Western and Pennsylvania had continued their new-car construction programs during the strike, but material shortages forced the PRR to suspend operations on November 1. An early estimate was that resumption of operations at the PRR's Samuel Rea Car Shop near Altoona, Pa., would not be possible until mid-December.

The Baltimore & Ohio resumed some car repairs in September and has steadily stepped up the pace since then. Louisville & Nashville has reported that material shortages would delay resumption of large scale car-repair operations, but that its locomotive shops have been in full operation for over a month. The Reading and Erie have reported that their car shop operations were resumed as the strike ended.

Container Transport Standardization

The Mechanical Advisory Committee of Trailer Train has taken steps aimed at encouraging standardization in the fast-growing field of container transport. Members of the Mechanical Advisory Committee of Trailer Train, meeting in St. Louis recently, studied a number of container applications and laid plans for continuing research as container standards are developed.

"Many people feel there is a definite trend toward containers just around the corner," according to Trailer Train General Manager J. E. Wightman, "and if this trend materializes, we will be in the vanguard in establishing compatible car equipment for this service, which will be of use to all our members."

The advisory committee, made up of mechanical officers from five of Trailer Train's member roads, said the St. Louis meeting was concerned with three principal problems: anchoring methods, impact cushioning requirements and means of fitting Trailer Train's present car fleet so it may carry either containers or conventional trailers. Several methods of loading and unloading containers were also studied.

The committee paid particular attention to the question of whether standardized containers, when they come, should have uniform tie-down attachments, or whether cars should be designed to be compatible with several varieties of container. The conclusion of the engineers was that a standard

(*Continued on page 8*)

TIME SAVING IDEAS FOR DECEMBER

MOTIVE POWER AND CAR

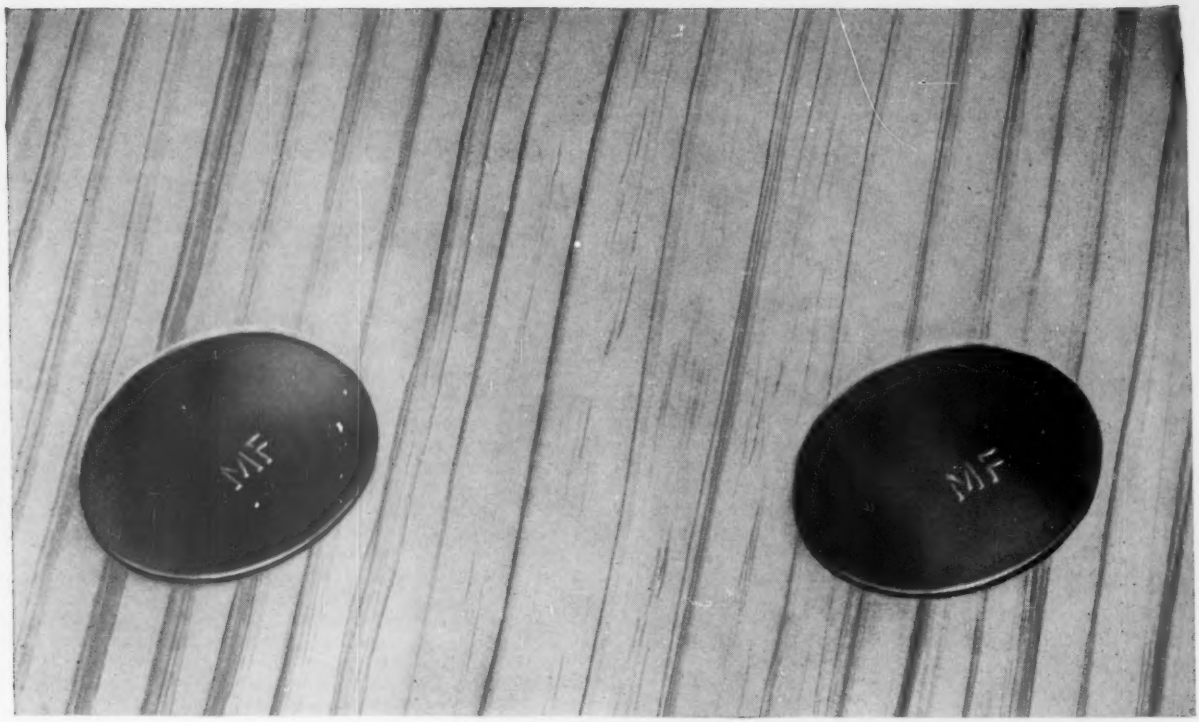
GN Speeds Box-Car Rebuilding 17
On C&O Diesels Feeder Simplifies Water Treatment 20
C&NW Starts 'Push-Pull' Service 22
How Pennsy Reclaims Lubricators 34
24RL Brake Equipment (Air Brake Schematics) 41

ELECTRICAL

Glass Banding of Traction Motors 46
Wrong Axle (Diesel Maintainer's Note Book) 51

DEPARTMENTS

What's New in Equipment 10
Editorials 15
Car Repair Time Savers 40
Personal Mention 54
Supply Trade Notes 56
Equipment Orders 57

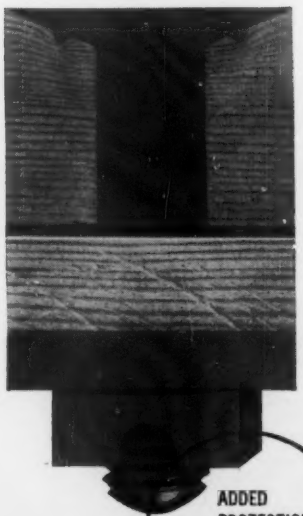


M·F WATER TIGHT BOLTS

lading protection

Large head—with self-sealing ring—prevents drawing head below surface of deck. No splintered flooring or infestation harbors. A smooth surface for maximum lading protection.

Be sure you specify "M·F," the *original* Water Tight Bolt.



RMI MEMBER

MF

MACLEAN-FOGG LOCK NUT COMPANY

5535 N. Wolcott Avenue, Chicago 40, Illinois

In Canada: The Holden Company, Ltd., Montreal



500 new "Roller Freight" cars delivered to Great Northern Railway

BY ordering 500 new, roller bearing-equipped freight cars, Great Northern Railway progressed its program of improved equipment and services. When the new cars are delivered, 1,581 of GN's nearly 40,000 freight-carrying units will be equipped with Timken® *tapered* roller bearings.

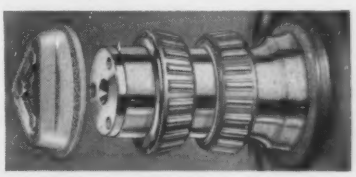
"Roller Freight" growth is breaking all previous records. Just since January 1, over 21,000 freight cars have been ordered equipped with Timken bearings. These cars boost the total on Timken bearings in service or on order to almost 47,000. And there are 87 railroads and private car owners now using Timken bearing-equipped freight cars. Big reasons why "Roller Freight" is growing at a rapid rate are:

1) *Speedier, better service for shippers.* Timken bearings eliminate the hot box problem—No. 1 cause of freight train delays. Timken bearings average 103 million car-miles between overheated bearings. They *roll* the load, don't slide it as friction bearings do. And Timken bearings speed shipments through terminals because they cut terminal bearing inspection time 90%.

2) *Reduced operating and maintenance costs for railroads.* Timken "AP" heavy-duty journal bearing assemblies are precision-engineered to give trouble-free service. And they will go 4 years without adding lubricant.

When all freight is "Roller Freight", the railroads will save an estimated $288,000,000 a year in operating and maintenance costs. And freight service will be faster, more dependable than ever. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

First in bearings for 60 years



BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

(*Continued from page 5*)

tie-down for all containers would be far more practical and would be no more difficult to obtain than the standard king pin of present truck trailers.

J. Howard Long, chief mechanical officer of Trailer Train, said that he believes the present 85-ft TTX cars can efficiently carry whatever length containers are eventually adopted as standard, and added, "We don't think it will be too difficult to convert them to dual use."

Total membership in Trailer Train, the nation's largest owner of piggy-back cars, is now 18 railroads and one freight forwarder. The Atlantic Coast Line; Gulf, Mobile & Ohio; Illinois Central, and the Seaboard Air Line are the newest members. The 18 roads represent 42% of the total Class I railroad mileage in the United States. All members have access to the 2,314 special flat cars TTX has in service and will have access to the additional 800 cars on order.

According to Trailer Train Board Chairman J. P. Newell, Train's business at the time of the St. Louis meeting was about 130% ahead of last year, compared with an increase in piggyback volume on a national basis of about 60%. Trailer Train members alone were carrying more than half the national total, "graphically illustrating the advantages of having a national pool of piggyback cars rather than separate ownership by individual railroads."

Journal Stop Effectiveness on NP

Effectiveness of journal stops and rear seals has been proved "beyond a reasonable doubt," according to the Northern Pacific mechanical department. In 1957, 450 box cars, built at the road's Brainerd, Minn., shops, were equipped with several designs of lubricator pads only. The cars, series 7000-7449, made approximately 13,538,450 car-miles during the first year's operation and had 150 hot boxes reported, or 90,260 miles per hot box. Of the 150 hot boxes, 136 involved two types of pads.

In June 1959, one year's service was completed on 450 box cars in the series 8000-8449, also built at Brainerd, but equipped with pads, journal stops, and two designs of rear seals. The cars made an estimated mileage of 17,580,375, with hot boxes reported on four with one make of lubricator, or 4,395,000 miles per hot box. Compared with cars in the 7000 series, the figures show over 48 to 1 in favor of journal stops and seals. By the end of the year, the road will have about 1,200 cars equipped with journal stops. Recommendations have been made to apply stops and seals to 1,600 cars during 1960.

Lubricator Installations Increasing Rapidly

A substantial increase in the installations of journal lubricating devices over the period ended December 31, 1958, is shown in the June 30, 1959, AAR Mechanical Division semi-annual survey. Railroad-owned cars jumped 31 per cent and privately owned cars 85 per cent in this six-months' period. At the end of June, 802,637 of the 2,075,219 cars owned by AAR members were equipped with lubricators.

	Cars with lubricators		Per cent of ownership	
	Dec. 31, 1958	June 30, 1959	Dec. 31, 1958	June 30, 1959
Railroads	552,038	725,258	30.6	40.3
Privately owned	41,878	77,379	15.1	27.9
Total	593,916	802,637	28.6	38.6

"Approval for Test" status has been withdrawn from six lubricating devices by the AAR Lubrication Committee. The six are Jeffers, Jour-Waste Pack, Armstrong Oiler, Cool-Pak, Albert, and Optimum with welded locks. The Committee's action does not apply to the Optimum lubricator with insert locks for use in integral and pedestal type journal boxes which was approved only recently (RL&C, Sept. 1959, p 103).

This action, according to the Lubrication Committee, is based on the performance record of each of the devices as developed in the summary covering the last regular semi-annual review of all journal lubricating devices. Two of the six devices had had "approval for test" status for over four years. The others were approved during 1958.

Orders and Inquiries for New Equipment
See Page 57

"Golden Spike" Advertising Competition

Entries are now being received for the ninth annual "Golden Spike" advertising competition sponsored by the Association of Railroad Advertising Managers.

The competition is open to any firm, industry or organization — other than railroads—whose advertising or promotion contributes to a better understanding of the importance of the railroads, or which directly or indirectly helps to promote rail freight and passenger traffic.

All types of advertising for consumer or business products and services—which in any way uses a railroad theme—is eligible. A single ad or a campaign qualifies. Any advertising appearing from January 1 to December 31, 1959 may be entered.

Entry blanks may be obtained by writing to the chairman of the Awards Committee, Albert L. Kohn, general advertising manager, Southern Pacific Co., 65 Market st., San Francisco 5. Proofs of advertisements or other material should be sent to him not later than January 15, 1960.

In addition to the "Golden Spike" plaque to the winner, Certificates of Merit will be issued to other entrants judged worthy of awards. Presentations will be made at the Association's annual meeting to be held in the spring of 1960.

30-Day Lubrication Period Cartridge Bearings

As recommended by the Lubrication Committee of the AAR Mechanical Division, periodic lubrication attention within 30 days has been made mandatory for cartridge journal bearings on cars in interchange. The new rule to be added in the 1960 Code reads:

"Rule 66-B—Cartridge journal bearings which have not received periodic lubrication attention within 30 days as indicated by stenciling on the car must be checked and AAR standard car oil added where necessary to restore maximum oil level, after which the filling plug must be properly replaced. Pipe wrenches or other wrenches that might damage the filler plug must not be used. Stenciling to be changed and charge made per Rule 101, Item 169-J."

Bearing designs involved are Clevite, Kar-Go and National. An applicable price for this work will be established in Rule 101 by the Committee on Prices for Labor and Material. The Mechanical Division advises that, if and when there are improvements in lubrication features of these bearings, the interested committees will determine the feasibility of extending the 30-day period.

U.S. Roads Seeking High-Power Locomotives

Higher horsepower in individual units has become of such great interest to two western roads that they have been negotiating with a German manufacturer for 3,000-hp diesel-hydraulic locomotives. A source close to the German manufacturer has indicated that seven of these high powered locomotives could eventually be in service on American rails.

The Union Pacific has acquired the last of the Great Northern's diesel-displaced a-c electric units. Best possibility is that the underframe and d-c traction equipment of this big motor-generator unit will be incorporated into the first coal-fired gas-turbine locomotive. It is reported that orders have already been placed with one manufacturer for the combustion and ash- and coal-handling equipment, and with another for the 8,500-hp gas turbine, compressors, and reduction gears.

The diesel-hydraulic unit which is reported to have attracted American attention is a modification of a 3,000-hp Krauss Maffei locomotive extensively tested on the German Federal Railways over the past 18 months. Major change planned to fit the unit for U.S. service would be provision of dynamic braking in the hydraulic transmission.

The unit is powered with two 1,500-hp, 12-cylinder Maybach engines. Each engine drives one of the pair of pivotless six-wheel trucks through a Mekydro transmission. Power output of the prototype locomotive is regulated by a 15-step controller. German designers say that the unit could be arranged to produce 4,000 hp. Engines and transmissions for these locomotives would be of the same general design as those applied to the lightweight locomotives built by Baldwin-Lima-Hamilton for the New

(*Continued on page 54*)



These lugging jobs were murder till NATIONAL brushes entered the scene!



M. R. TRUMBLE

Short brush life and unsatisfactory traction motor commutation reduced efficiency of an eastern railroad, says "National" Carbon Brush Man Moe Trumble. This was particularly true of equipment hauling heavy loads over hilly terrain.

A test was initiated utilizing "National" brush grade DE-5. After a sufficient test period — with variables reduced to a minimum — grade DE-5 brushes improved both commutation and brush life. Based on these results, the road standardized on this brush.

Throughout this extensive test, Moe Trumble kept in close contact with the railroad and cooperated fully with its test program. This is a service your local "National" Brush Man can and does perform. Call on him to assist on your brush problems. He is happy to offer assistance.

"National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

NATIONAL CARBON COMPANY • **Division of Union Carbide Corporation** • ***30 East 42nd Street, New York 17, N.Y.***

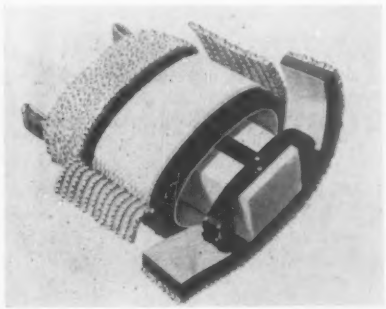
OFFICES: Birmingham, Chicago, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco • **CANADA:** Union Carbide Canada Limited, Toronto

LOCOMOTIVES AND CARS **WHAT'S NEW** IN EQUIPMENT



Steam Conduit Gasket

The Teflon faced gasket for passenger car steam conduits, it is said maintains mechanical stability to 500 deg, withstands most chemicals and is unaffected by moisture. Field tests show the gasket will last three times longer than other gaskets. According to the manufacturer, reduction of friction provides free movement of the conduit, and the gasket mates well with the conduit nosepiece. Teflon is interchangeable with original gaskets and comes in four sizes, the 2- and 2½-in. long and short skirt. *Vapor Heating Corp., Dept. RLC, 6420 Howard st., Chicago 48.*

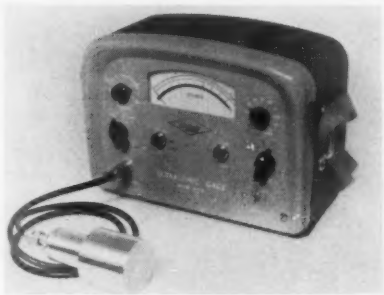


Improved Lubricator Pad

New spring-steel rings with radius reinforced clips; continuous perimeter lubrication wick, which is said to assure 100 per cent wicking, and a new polyurethane foam core have been incorporated in the conditionally approved Spring-Pak lubrication pad. The improvements have also received AAR conditional approval. According to the company, the new steel rings are damage-proof in normal operation; assure constant pad contact with the journal, and are not affected by oil or heat. A tufted cotton cover provides continuous wicking, and beneath the cover there is a highly absorbent felt oil reservoir. *Spring Packing Corp., Dept. RLC, 332 S. Michigan ave., Chicago 4.*

Epoxy Aluminum Paint

Epoxy aluminum adheres to metal, plastic or wood. It is said to last four times longer than ordinary aluminum paints. It can be air dried or baked, and is especially resistant to abrasion, impact, corrosion, and severe weather. It is unusually resistant to such solvents and chemicals as caustic and amine vapors, sulphur dioxide, hydrochloric acid vapor, benzine, etc. *Champion Bronze Powder & Paint Co., Dept. RLC, 2101 N. Elston ave., Chicago 14.*



Portable Ultrasonic Thickness Gage

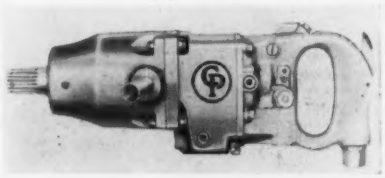
A portable ultrasonic thickness gage that weighs only 10 lb can be used for measuring thickness and inspecting corrosion in pipe, storage vessels, and other applications. The gage uses transistors and low-voltage batteries. It may be strapped on the operator's back and used in a welding area to prevent welding of laminated plate, or of plate containing excessive stringers. Measurements may be read on a directly calibrated meter. Alarm lamps are provided to set thickness limits. *Sperry Products, Inc., Dept. RLC, Danbury, Conn.*

Carbon Brushes

The Triflex design for electrical brushes features three-section construction, with a hammerplate riveted to the long section and passing over all three sections. Preliminary tests on main generators of diesel electric locomotives are said to have been favorable. The design is a development of the Multiflex construction which is in two-section form. *Speer Carbon Co., Dept. RLC, St. Marys, Pa.*

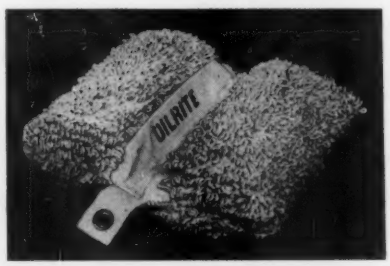
Air-Powered Impact Wrench

The CP-612-RLTP torque control reversible impact wrench is capable of a torque output as high as 1,000 ft-lb. The torque-control mechanism is totally enclosed, keeping tool length to a minimum and eliminating need for extensions and adapters. The tool weighs only slightly more than its predecessor, but is said to pack 25 per cent more power in its 19-in. frame. The tool features the CP spline drive shank with the built-in Socket-Lok. It can be used for torquing 1-, 1⅛-, and 1¼-in. high-tensile bolts on structural-steel, or, by pressing the lock-out button above the pistol-grip handle, it can be used as an impact wrench with a full 1½-in. bolt capacity. *Chicago Pneumatic Tool Co., Dept. RLC, 6 E. 44th st., New York 17.*



All-Purpose Liquid Cleaner

Turco Plaudit is a mild, multi-purpose liquid compound for industrial cleaning by such methods as steam, emulsion, immersion, ultrasonic, and wipe-on operations. Upholstered surfaces inside coaches and Pullman cars are cleaned by "fog-on" method; painted surfaces, by wipe-on method. Liquid is also used as acid brightener additive to simultaneously clean, brighten and deoxidize aluminum and stainless steel truck trailers. *Turco Products, Inc., Dept RLC, 24600 South Main st., Wilmington, Cal.*



Journal Lubricator

The Oilrite twin-pocket journal lubricator is designed to deliver oil and maintain constant contact with the journal under all operating conditions. The polyurethane cores absorb oil and are equipped with brass springs to assure journal pressure. The outer covering is cotten chenille. Oilrite is AAR approved for test application in interchange. *Oilrite Journal Lubricator Co., Dept. RLC, 1400 E. Tremont st., Hillsboro, Ill.*

(*Turn to page 58*)

CPS RES-I-GLAS®

GLASS BANDING TAPE

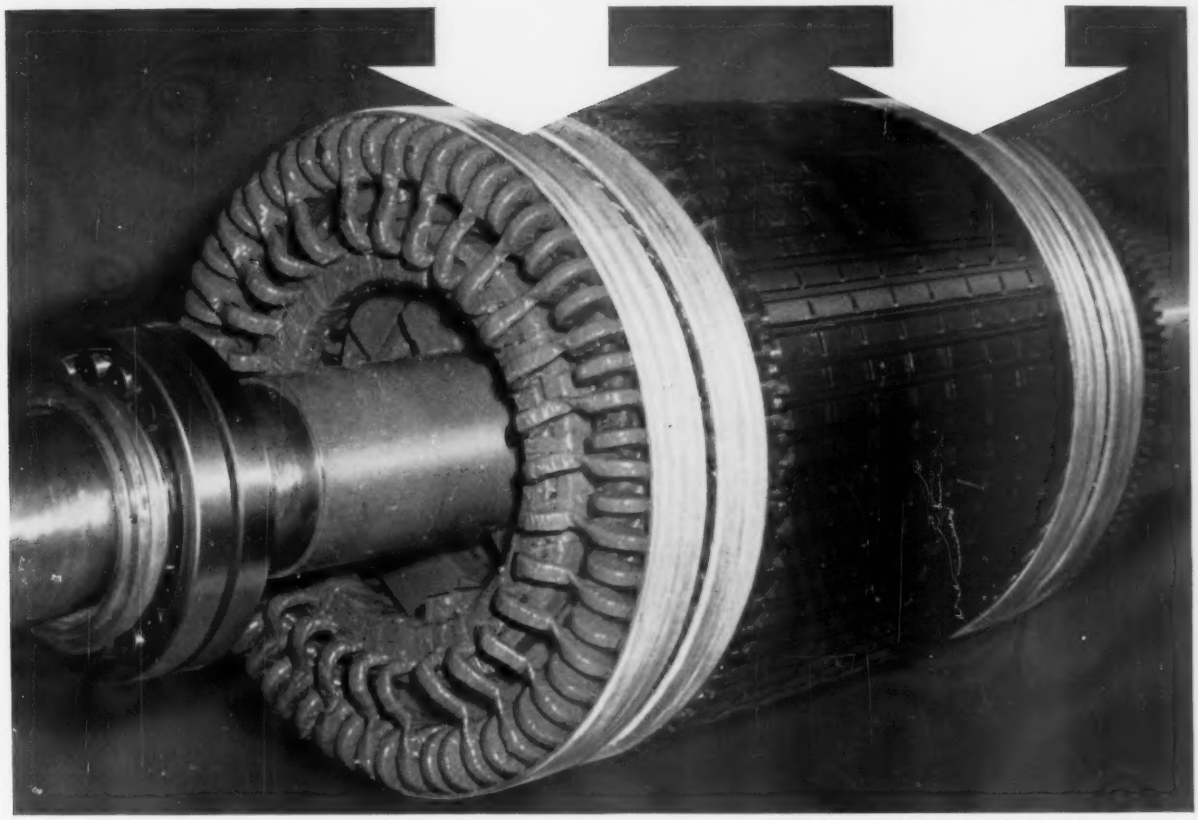


PHOTO: Courtesy National Electric Coil Division McGraw-Edison Co.

For Proven, Dependable Bands **Superior Performance**

In use for three years in most major shops **Lower Cost**

AND NOW
CPS RES-I-RAY
STRING BANDING
TAPE T. M.

Developed jointly with Westinghouse. *Designed for this specific usage.* Selected rayon yarns, bonded and heavily impregnated with a blend of thermosetting resins (fully catalyzed and semi-cured) —Eliminates flashover, tracking, low resistance caused by moisture. Gives a perfect band every time!

See us at the Second National Conference on the Application of Electrical Insulation and Trade Show

CHICAGO PRINTED STRING CO.
INDUSTRIAL DIVISION
2300 Logan Blvd., Chicago 47, Illinois

RES-I-GLAS® DISTRIBUTORS

Earl B. Beach Co. (and branches)
Box 8623, Verona Road
Pittsburgh 21, Pennsylvania

Electrical Insulation Suppliers, Inc.
500 Means St., N. W.
Atlanta, Georgia

The Huse-Liberty Mica Co.
Peabody Industrial Center
Lynnfield St., Peabody, Massachusetts

Insulation Manufacturers Corp.
(and branches—and authorized IMC representatives)
565 W. Washington Blvd.
Chicago 6, Illinois

C. D. La Moree (and branches)
2433 Birkdale St.
Los Angeles 31, California

Robert McKeown Co., Inc.
99 Dorsa Ave., Livingston, New Jersey

National Electric Coil Co.
(and branches)
800 King Ave., Columbus, Ohio

C. E. Riggs, Inc.
422 N. W. 8th Ave., Portland, Oregon

Southern Electric Co.
5025 Columbia Ave., Hammond, Indiana

Summers Electric Co., Inc.
1502 S. Good-Latimer Expressway
Dallas 10, Texas

White Supply Co.
4343-47 Duncan Ave.
St. Louis 10, Missouri

CANADA

Andrew Gilchrist, Ltd.
155 Decarie Blvd.
St. Laurent, Quebec, Canada

H. P. Ruggles Company, Ltd.
88 Caroline St., N.
Box 62, Hamilton, Ontario, Canada



The progressive Canadian Pacific Railway
863 Piggyback Cars





now has in service equipped with COBRA® SHOES

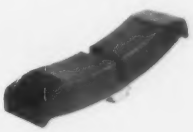
Good braking is an important customer benefit offered shippers who use Canadian Pacific Piggyback Service. Fewer sudden or jerky stops mean safer transport of both carriers and cargo. The result is an ever-increasing preference for this economically sound way of delivering freight between Canada's key distribution points.

In addition to their smoother braking performance, the COBRA SHOES on these high-demand piggyback cars are an important factor in keeping them in service. Because of the longer life of COBRA SHOES and greater wheel mileage obtained from wheels braked with COBRA SHOES, very little time is spent for shoe or wheel replacement.

The application of COBRA SHOES to its piggyback cars is but the latest indication of the Canadian Pacific's adoption of this improved brake shoe. Following its first order in May, 1956, and its successful use on an overnight compartment car on the Montreal-Toronto run, the Canadian Pacific has installed COBRA SHOES on 48 commuter cars, 22 transcontinental sleepers, 863 piggybacks, and on 115 diesel switcher and road locomotives.

COBRA SHOE installations are growing in expanding number and volume. Like the Canadian Pacific more and more railroads turn to COBRA SHOES as service evaluations repeatedly demonstrate their smoother performance and their economy through greatly extended service life.

Write for a copy of a special brochure which covers in detail the many benefits to be derived from using these truly revolutionary brake shoes.



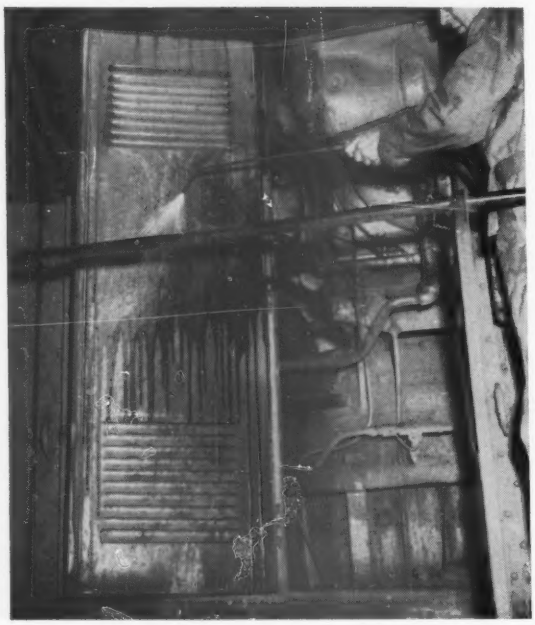
The COBRA SHOE... a product of the combined research facilities of

WESTINGHOUSE AIR BRAKE COMPANY
Specialists in Braking

JOHNS-MANVILLE CORPORATION
Specialists in Friction Material

RAILROAD FRICTION PRODUCTS CORPORATION *Wilmerding, Pennsylvania*





Beat rising maintenance costs by modernizing diesel-cleaning operations with time-saving

LIX

DIESEL CLEANERS

With maintenance costs continuing to increase and with railroad income restricted, efficient and economical cleaning of diesels is more important now than ever before. That's why more and more railroads are switching to LIX Diesel Cleaners. Efficiency comparisons have proved to these economy-minded roads that Lix cleans BETTER and FASTER . . . cuts man-hours 'way down.

Lix cuts through grit, grime and caked carbon with amazing speed . . . without any scraping or brushing. Even hard-to-clean lube oil coolers come clean quickly. Lix Cleaners are SAFER, too—they're low in toxicity, are not a fire hazard. Because of their greater efficiency and because they have longer life without frequent charges, Lix Cleaners cost less in the end than "economy" cleaners.

Behind each Lix Cleaner—for spray or tank-soak use—are years of railroad cleaning experience, combined with constant research.



PROVE TO YOURSELF how you can cut cleaning costs! Write or phone for a Lix **DEMONSTRATION** in your shop—without cost or obligation!

WHATEVER THE DIESEL-CLEANING JOB . . . . in the complete Lix Line there's a cleaner that will do it FASTER and BETTER!



PRODUCTS OF RESEARCH

THE Lix CORPORATION OF MISSOURI

300 WEST 80th STREET — DEPT. 10
KANSAS CITY, MISSOURI

EDITORIALS

A Yard Stick for Power Costs

Beset by constantly increasing highway and airway competition, the railroads are constantly looking for ways to move trains faster and for less cost. The diesel, which was heralded as a savior of the railroads, is now being pressed to do more. There are now three different types of diesel engines in service which are rated 2,400 hp. It is hoped that 3,000-hp units may be developed.

To meet its big power requirements, the Union Pacific introduced 4,500-hp gas-turbine locomotives and, in the past year, 8,500-hp units. Because of the availability and price of the kind of fuel needed for the gas turbines, they are better suited to the UP's needs than to those of other railroads. They have, however, demonstrated what a railroad can do with that kind of power.

Recently the Pennsylvania announced it would lease 66 new locomotives. To be sure, the Pennsylvania already owns an electric power distribution and contact system. But the order in itself indicates that a railroad with electrification believes that the electric locomotive in heavy traffic will outperform the diesel with lower costs in maintenance and depreciation. Data now becoming available indicates that the economic life of a diesel is not more than 15 years. Similar data shows the electric locomotive's economic life to be about 30 years. To take advantage of this circumstance, of course, requires that, when an electrification is installed, the user must be able to foresee the need of electric power for that length of time.

Several of the reasons for using electrification in the United States disappeared after some years of service. In a number of places the electric locomotive eliminated the smoke hazard in tunnels created by steam locomotives. When the diesel came along, it proved its ability to negotiate these tunnels without hazard. It made the change of locomotives at each end of tunnel sections unnecessary, and the electric operation was abandoned. Electric power with m-u cars having high acceleration rates is ideal for commuter service, but current railroad economics have caused railroads to want to abandon this class of service.

Now conditions have again changed to increase the desirability of using electric power, at least for heavy traffic and heavy grades. First, is the fact that the electric locomotive can develop power in single units of 5,000 and 6,000 hp which have short-time ratings of 9,000 and 10,000 hp.

Second, a power distribution system utilizing commercial frequency (60 cycles) at a potential 25,000 volts is now satisfactory for railroad electrification. This was made possible by the development of rectifiers suitable for use on the locomotive. Coupled with this is the growth of the utility company power systems. Some of these are now so large that a single-phase railroad load would cause no objectionable voltage or phase unbalance.

Third, the locomotive-borne rectifier presents the possibility of making electric locomotives out of diesels now in the service of the railroads. The engines and generators would be replaced by rectifiers and control equipment, with power being collected from an overhead wire.

Fourth, a material reduction in the cost of electrification can be made if the section of railroad is equipped with centralized traffic control. In the past, it has been necessary to change the signal system when a railroad was electrified. This was then chargeable to electrification and was a major cost item.

All of these factors, and several more, were included in a study made recently for a section of an eastern railroad having heavy traffic and heavy grades. The study was summarized in a paper by H. C. Cross, Westinghouse Electric International Company, presented to the New York Section, Transportation Division, American Institute of Electrical Engineers, October 13, 1959. According to Mr. Cross's figures, the installation would require an investment which would be 21 per cent more than that for diesel operation. The saving indicated for the overall investment was 12 per cent, and the saving as applied to new money would be 73.5 per cent.

Such an installation as Mr. Cross suggests could best be applied to heavy traffic lines in areas where there are large utility company networks. This generally would be an area east of Chicago and north of the Tennessee Valley power sources. It offers a means of getting power from coal when it appears that the cost of liquid fuel is getting out of reach. Particularly when it becomes necessary to replace engines in service on diesel-electric locomotives, it gives railroads something with which to compare their current and forthcoming operating costs.

New Motive Power Types

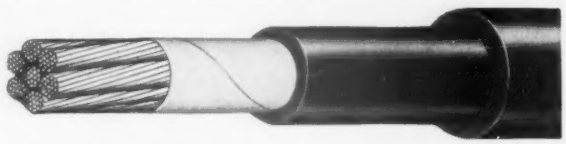
The current interest in two new locomotive types as reported on page 8 of this issue is a refreshing bit of news. Many years of research and testing and a large investment have gone into the development of a coal-burning prime mover. It would be disappointing indeed if this prime mover were not given the opportunity to prove itself by road service in a locomotive. The building and testing of this locomotive by a large western road will permit its engineering and economic evaluation.

Experience with diesel-hydraulic locomotives on American railroads has been limited to low horsepower switchers and the 1,000-hp Xplorer power unit. That two western roads may acquire several German-built diesel-hydraulics of 3,000-hp, possibly 4,000-hp, capacity, represents a milestone in the development of hydraulic transmissions for road service.

The performance of both types of power will be followed with keen interest by all railroads, the turbine unit particularly by those roads with coal holdings.

You'll find the cable you need in this full line of General Electric cables FOR LOCOMOTIVE WIRING

FOR POWER CIRCUITS



For all general-purpose power circuits in diesel-electric and electric locomotives use SI-58215 or SI-58217. These cables are easy to handle and pull through conduit. Small over-all diameters simplify installation in limited spaces.

SI-58215: Extra-flexible rope stranded, coated-copper conductor. Also available in smaller sizes for control and auxiliary circuits. Meets AAR Specification 581.1.

SI-58217: Same as SI-58215 except aluminum conductor.

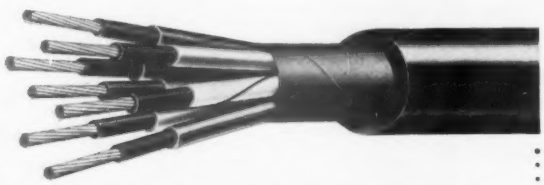


For 3000-volt d-c motor leads, as a high-voltage lead-in cable, or for any application requiring single-conductor non-shielded portable cable for locomotives and cars, use SI-58260.



For insulation with resistance to high heat—in dry locations, exposed, or in conduit, such as in accelerating power leads or resistor leads, use SI-57049 (rated 600 volts, 110 C conductor temperature); SI-57051 (rated 5000 volts, 100 C conductor temperature).

FOR CONTROL CIRCUITS



For control wiring in diesel-electric and electric locomotives and multiple car units, use SI-58135. Rated 600 volts, 75 C conductor temperature.



For low-voltage control wiring in diesel-electric and electric locomotives, use SI-58218. Rated 300 volts, 75 C conductor temperature.

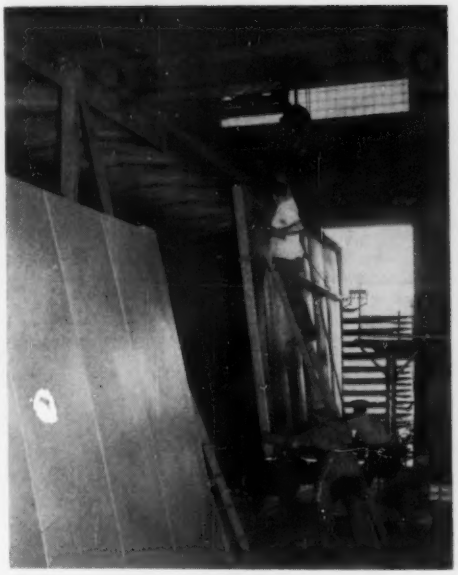


For control panel wiring where extremely high temperatures are encountered use SI-57334. Rated 300 volts, 125 C conductor temperature.

General Electric offers you a complete line of locomotive cables built to meet the requirements of new or maintenance wiring in power and control circuits. For further information write to Section W-231-1247, Wire and Cable Department, General Electric Company, Bridgeport 2, Conn.

Progress Is Our Most Important Product

GENERAL ELECTRIC





Steel sides, replacing original wooden ones, and heavier floors to fit cars for today's service were major phases of Great Northern program for rebuilding 20-yr-old box cars.

GN Speeds Box-Car Rebuilding

New stripping, welding, and priming techniques have been utilized in heavy car repair program

Three fast-moving operations stand out in the current heavy box car repair program at the St. Cloud, Minn., shop of the Great Northern. One thousand wood-sheathed box cars are involved. They are being equipped with shop-built steel sides. Production has been at the rate of seven cars per day with a working force of 246 men.

These cars are part of a series of 7,000 built between 1937 and 1942 by ACF, General American, Pressed Steel, and Pullman-Standard. Previously, 1,000 had been equipped with plywood exterior siding, and another 1,000 with Youngstown steel sides. At present 250 more are being converted to stock cars at Great Falls, Mont.

Three operations which have been major features of the current program are:

• Stripping methods which have cut the labor involved in preparing the cars for rebuilding from 32 to 23 man-hours per car;

• Assembly of new side panels with Air Reduction welding equipment on special jigs;

• Priming of the completed sides on a special paint line which has been set up just beyond the side welding operation.

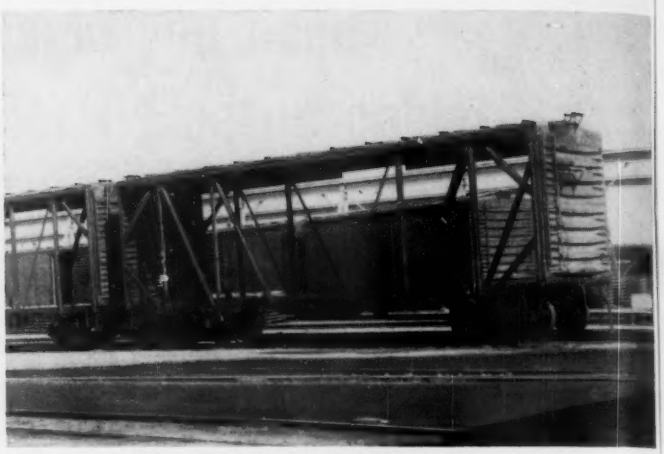
In stripping the cars, all safety appliances, door posts, decking bolts and filler angle bolts are burned off initially. The bottom belt rails are loosened, and a few boards removed from the outer siding. A chain is then run through and around the siding which is pulled off by an Austin-Western crane. The inner lining is shoved inward and finally off by the crane boom. A few floor boards are then lifted, and a drag device, which is pulled through the car, removes all decking.

Material for the new sides is copper-bearing steel. Side sills are 3½ x 6x5/16-in. angles, and door posts are formed of ¼-in. plate. Sides are 12-gage sheets, all 9 ft 9⅛ in long and in three widths: 32-7/16, 42-⅝, and 39-3/16 in. They are flanged on special dies to form panels incorporating the door posts, also the intermediate, corner and bolster posts. Twenty-four of these panels make up the completed sides. Six panels—a half side—are placed in a jig on the welding table and clamped. Bottom and top angles are applied and spot welded. Automatic welding of the seams between the panels follows. The assembly is then raised to the vertical position and stitch-welded on the reverse side.

The side section then moves on rollers through a hot water wash, dryer and paint spray booth to a flat car for transfer to the application station on the production line. These operations take about 2 min. Water at 100 psi pressure and 150 deg F, with a mild acid additive, removes all the



Dismantling of sides and floors preliminary to the rebuilding has been facilitated by use of Austin-Western crane truck. GN reduced labor expended in dismantling by approximately one-third.



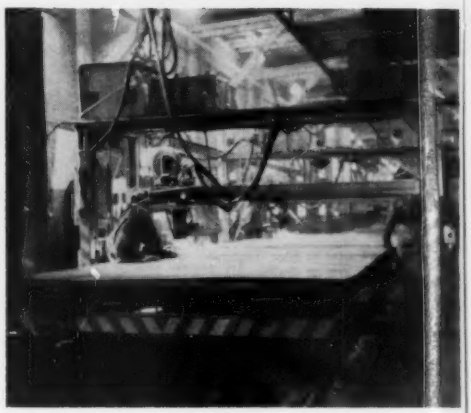
Ready for rebuilding, cars retain their original roofs, side posts, ends and underframes. These structural components are straightened where necessary. Floors were reinforced as part of the program.

mill scale and oil, assuring paint adhesion. Steam coils dry the section as it moves to the painting position. The air-operated paint spray nozzle moves up and down, automatically applying one coat of primer.

Interiors of the cars are steel lined with 3/16-in. plates extending up 40 in. on the side and end walls. Above this point Nu-Loc fir siding is used. MacLean-Fogg individual lading anchors are used in the fir lining; bar type anchors in the steel siding. The steel lining is coated either with Archer-Daniels-Midland plastic coating No. 410, or with Mortell Apoxymat Timber Tan.

Wood decking of the rebuilt cars is protected with Standard Railway Equipment floor plates and with MacLean-Fogg threshold plates in the doorway area. A 26-gage galvanized iron is applied to the underside of the decking over the trucks for fire protection purposes.

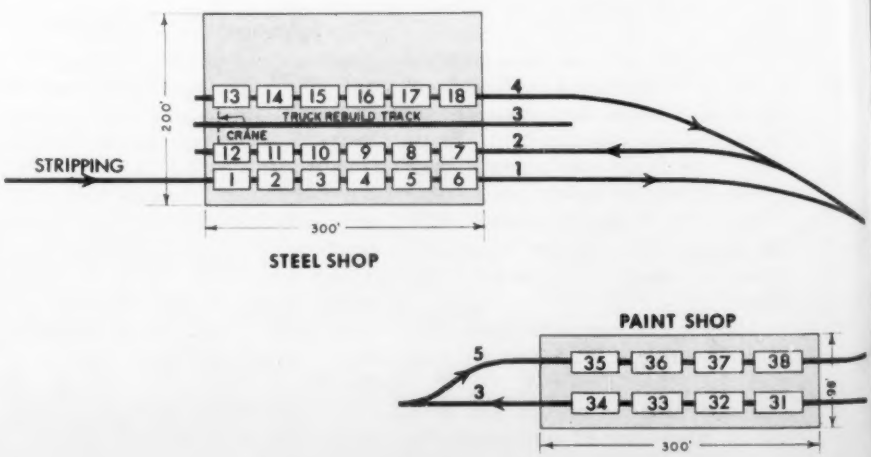
Trucks, as rebuilt, include journal lubricators, test applications of Magnus journal stops, package and individual unit snubbers, 2½-in. travel springs, Stucki side bearings, and Gripco, Drexel or Creco brake-beam supports. Finished cars get bright red paint, reflective lettering and Scotchlite delineators on side sills.



Wire feeder travels along rail. Berkeley side beam carriage moves welding head 140 in./min.

Sequence of Operations at St. Cloud Shop

1. Cut off side bearings, center castings, draft gears, all bolts and brackets. Jack car.
2. Apply four additional rows of floor stringers.
3. Weld center castings, side bearings, floor stringers, diagonal braces and side sill gussets. Lower car.
4. Apply draft gears and couplers. Work with Station 3, applying center castings and side bearings. Straighten posts and braces.
5. Straighten steel ends and corner posts. Burn off stub door posts, top and bottom. Burn off paint on side plate in preparation for welding.
6. Complete all welding. Clean and scale welds.
7. Apply steel sides to car. Apply corner bands and side sill angle patch plates, and clamp for welding. Tack and weld material to car.
8. Apply and weld post strips, side sill closure plates, gussets under side sill angle, shim plates on body bolsters and crossbearers. Tack side sheet to corner posts.
9. Apply and weld sheets to posts and braces, closure plates, and threshold plates. Apply starter panel of decking.
10. Apply car cement to side sill closure plates.
11. Line up corner and door posts. Position side sheets to side plates and corner posts, and weld.
12. Apply decking, and ream and drive decking bolts. Assist in taking trucks to stripping track. Place deck panels in car.
13. Move carbody with 20-ton overhead crane to rebuilt trucks from Track 2 to 4. Apply door post stops. Put running board sections on roof. Position side doors.
14. Apply and bolt running board. Apply all air-brake piping. Weld front stops and all



MANPOWER ASSIGNMENTS

Stripping yard	20
Steel shop:	
Track 1	19
Track 2	22
Track 3*	10
Track 4	32
Wood car repair shop, Track 3	27
Steel side assembly	9
Paint shop	14
Floor plate assembly	6
Fabrication bay	28
Repairing doors	4
Material handlers	7
Wood mill	16
Sheet metal shop	6
Blacksmith shop and reclamation	18
Machine shop	4
Machinist and electrician	2
Laborers	2
Total	246

*Truck stripping and assembly.
**For maintenance.



Floor panels are bolted to side sills and clipped to the floor stringers. New side sections are designed to fit around original side posts. Lower inside end and side walls are lined with steel plates and Nu-Loc wood siding is then used to line car on up to the roof.



Constant arc length in CO_2 shielded welding is assured by design of this Aircomatic unit.

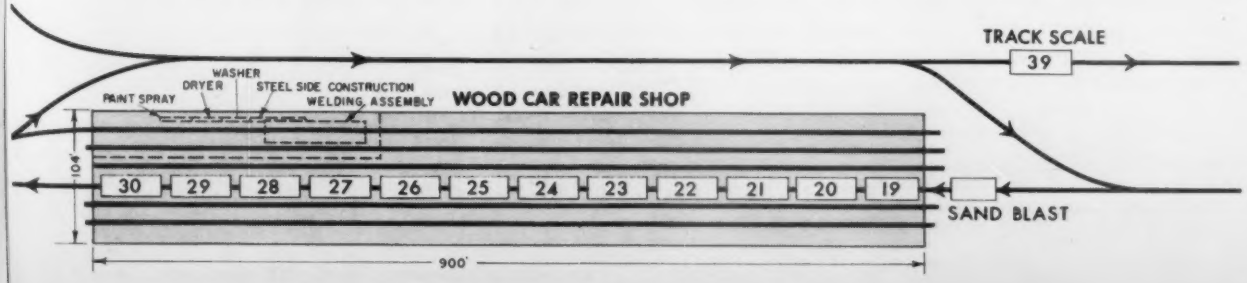


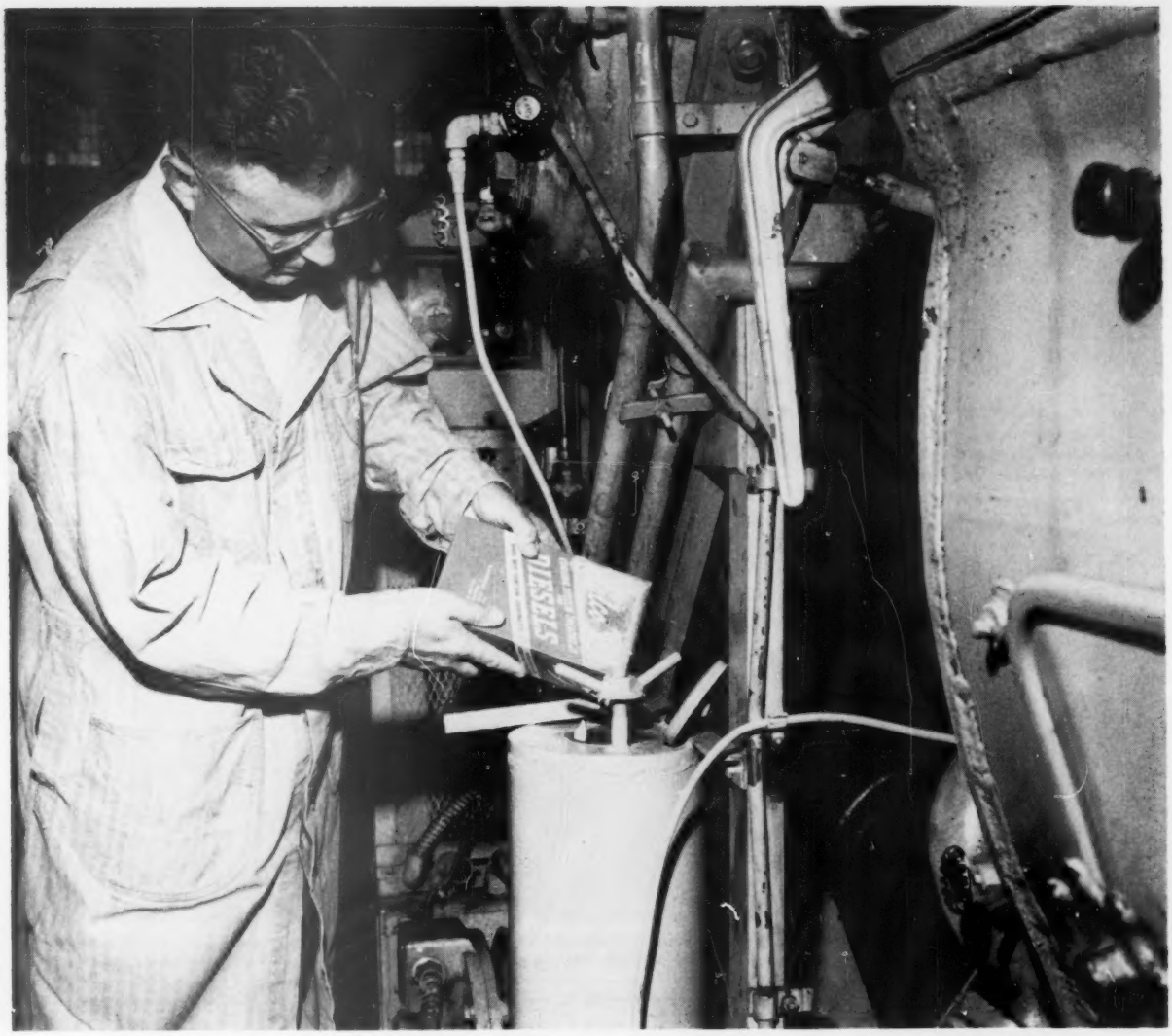
Panel flanges are stitch-welded with Aircomatic water-cooled portable welding gun.



Moving spray nozzle on vertical guide is used to apply primer coat to half-side sections.

brackets, defect card holders.
15. Apply nuts on decking bolts. Apply and tack bar lading anchors. Mark locations for welding studs. Tack filler bars for metal lining. Apply and tack safety appliances. Apply brakes and backing angles. Weld reinforcement channel to side sill and side sill angle.
16. Apply and tighten nuts on decking bolts. Apply welding studs to door pans, ends, corner posts. Weld girder plate and J iron to posts. Rivet safety appliances.
17. Rivet safety appliances. Apply and tack metal end lining. Weld holes in steel ends and corner posts. Weld one side of doorway deck. Weld sheets to posts. Rivet side bearings on trucks.
18. Jack car for riveting. Gage side motion and ream side bearings. Finish welding of end lining. Weld opposite side of doorway deck. Sandblast booth. Sandblast underframe and steel ends. Track 3, outside east end. Pull and clean cars. Remove end lining retainers. Cover air hose.
19. Material stocking.
20. Apply standard lining, drive and secure bolts. Apply finish pieces of fir decking and steel angles.
21. Material stocking.
22. Apply side, end and door post fillers, and placard boards.
23. Apply steel side lining and wood perishable strips.
24. Clean AB brakes, repair leaks. Test car.
25. Apply fir lining, sides and ends. Apply end lining retainers.
26. Finish weld steel side lining.
27. Vacant.
28. Finish nailing side and end lining.
29. Caulk side threshold plates, door posts, and ends of decking. Apply undivided lading anchors.
30. Weld individual lading anchors and floor plates.
Track 1, outside east end steel shop. Clean and prime side sills and frames. Dip ladders, grabirons and fir fillers.
Track 3, outside east end wood repair shop. Prime steel ends. Spray aluminum paint on ceiling. Spray lining coating 18 in. up. Spray doors vermilion.
31. DeVilbiss traveling paint spray booth. Underframe sprayed in pit. Car Lining sprayed. Vernic floor hardener applied on wood decking at ends of car.
32, 33, 34. Vacant. Work done at station 31.
35. Black spot for "Goat" stencil painted on car. Fillers and ladders dipped.
36, 37, 38. Apply "Goat" stencil, reporting name and numerals, capacity stenciling, delineators. Stencil AB brakes, trucks, etc.
39. Scale station. Cars light weighed and stencilled. Touch-up painting as required.





Placing feeder at "front" end of EMD engine on GP-9 road switcher makes addition of water-treatment pellets easier.

On C&O Diesels . . .

Feeder Simplifies Water Treatment

By J. J. Dwyer

The value of high quality water treatment in diesel locomotive cooling systems is recognized by progressive railroad managements. Application of this chemical treatment, however, has not always been without its problems. The Chesapeake & Ohio has recently come up with its own solution, a special chemical feeder now being applied on all C&O diesels. Each use of this feeder saves ¼ man-hour over methods previously used.

The large radiator filler pipe, through which water treatment chemicals are usually introduced, is on the roof. This is not the most convenient part of the unit to reach. The passage from the filler cap to the water tank frequently is not a straight open pipe free of obstructions. There are turns, inclined or horizontal sections of pipe, and projections such as elbows and street ells from vents and supplementary water-fill connections.

These projections do not interfere with the flow of water, but present problems in introducing chemical pellets or materials not readily soluble. No diesel locomotive design appears to be completely without them.

Another problem was preparation of the water treatment. Commonly used compounds came in a granular form, or in pellets about the size of peach seeds. Generally, they are dissolved or mixed with hot water to make a slurry, and this must be done where steam or hot water is available.

Mr. Dwyer is chief chemist, C&O, at Huntington, W. Va.

The mixed materials then had to be carried in large buckets back to the diesel and up a ladder to its roof.

In too many cases the water treatment compound lodged somewhere in the filler pipe, or the diesel was dispatched before the assigned employee found time to go through with the preparation procedure and could put the material in the cooling system. Taking down and cleaning clogged filler pipes consumed additional man-hours.

When it was pointed out that the road was not getting full return or maximum protection from its water treatment, authorization was given to solve the problem. The C&O diesel chemical feeder was the result.

The feeder, itself, is a simple device with no moving parts. It operates by differential pressure, the same way as the soda ash briquette feeders which were common years ago for providing wayside treatment for steam locomotive boilers. These old "ball" or "by-pass" feeders fell into disuse because of their inability to provide accurate proportioning. The diesel feeder is not used as a proportioner, but only as a convenient means of injecting chemicals into the cooling system. For this purpose, it works very well.

The device is connected with ¼-in. copper tubing, the inlet running from the engine water pump discharge to the bottom of the feeder, and the outlet from the top running to the cooling system tank. This outlet enters above the water line of the tank whenever possible so as to eliminate one valve. There is a continuous flow of hot water through the pot at about 25 psi pressure. Any chemicals applied are dissolved into the circulating water in short order.

Designed by C&O

When the need for this feeder developed, the market was surveyed for commercial products. Those found were either too small or too large and were also too costly for the use intended. The C&O feeder, designed specifically for diesels, has the proper capacity and a quick-opening lid. Costs are kept low by combining fabrication and installation operations where possible.

The unit is made from a piece of 8-in. diameter wrought-iron pipe 13½ in. long. The cap is held by a compound lever and wing nut which can be tightened by hand and can be loosened in seconds.

While the device was designed primarily for pellets, any solid, granular, or liquid treatment may be applied with equal ease. The opening in the top is 3 in. in diameter, permitting pouring chemicals directly from manufacturer's original packages. Employees can introduce the treatment compounds without contacting them. The entire charging operation takes only 2 or 3 min. The feeder can always be charged at running-board level. The feeder is the same for all units—only the mounting brackets are different.

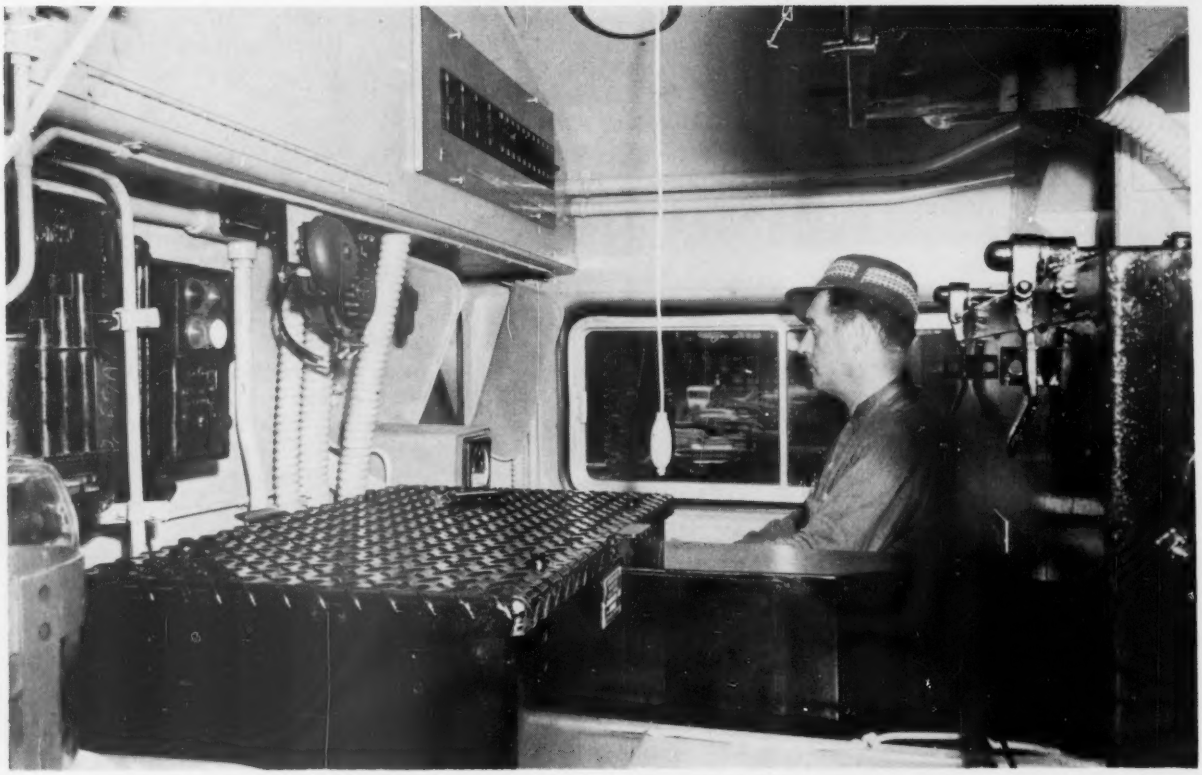
An added advantage obtained from the feeder is that the drain valve also serves as a sampling valve to supply cooling-water samples for chemical test purposes. This procedure for sampling is not only more convenient than taking the sample from the gage glass pet cock, but provides a truly representative sample, which is not always obtained from gage glass.



Piping of feeder is not complicated. Tube from top extends to cooling system water tank.



Feeder being completed is for application to 1,000-hp Alco switcher. Bracket is welded between carbody doors. Deck-mounted feeder (back-ground) goes on 1,800- and 2,400 hp Alcos.



Cab of push-pull train's leading coach has full set of locomotive controls for EMD diesel which may be nine cars back. This type of operation makes possible greater flexibility and reduces the amount of switching necessary in crowded Chicago terminal of C&NW.

C&NW Starts 'Push-Pull' Service

Cab cars can give an operating flexibility similar to that possible with multiple-unit electric cars

Many of the 40,000 daily Chicago & North Western commuters are already riding in new bi-level push-pull trains. By early January, the road will have all 36 cars ordered from Pullman-Standard late last year (RL&C, January 1959, p 30). The general arrangement of the new equipment is basically like that of the 48 bi-level cars built for the C&NW by Pullman-Standard and St. Louis Car over the past few years. In each car there are two bi-level coach sections separated by a center entrance vestibule.

Eight of the new cars have an engineman's cab built into one end of the upper level. All cars in this latest order are designed for bi-directional operation in trains of nine cars maximum length, powered by an A unit E-8 2,250-hp locomotive at one end. The train can be controlled either from the locomotive, or from the cab car at the other end of the train. The C&NW estimates that these 36 cars will cover 25 daily runs.

Seating capacities are 161 for the trailer car and 155 for the cab car, which can be used anywhere in the train as a regular coach. A train may have one or more cab cars within its consist as well as one at the end for control purposes. This makes it possible to divide a long rush-hour train into two shorter trains for off-peak service.

General Dimensions

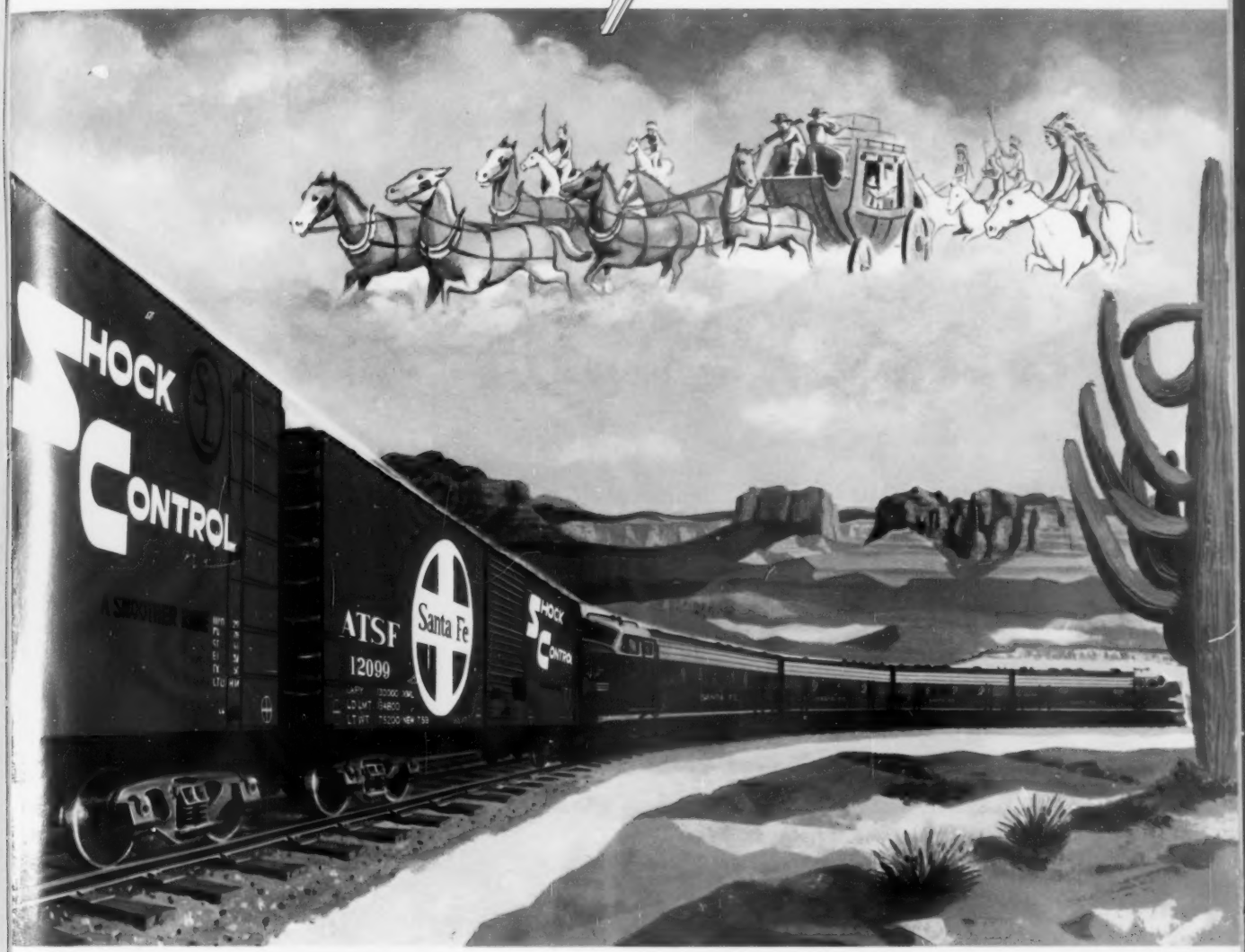
Length over buffers, ft-in.	85- 0
Width over side sills, ft-in.	10- 0
Inside width, ft-in.	9- 3-5/8
Width of side door opening, ft-in.	6- 6-1/2
Overall height, ft-in	15-10
Weight, trailer car, lb	123,400
Weight, cab car, lb	128,500

The cab can be entered from either of the upper level galleries which extend through each side of the car. In arrangement, the cab is similar to that of a diesel locomotive. It is fitted with control stands, adjustable seats, front windshields with air wipers, and sliding side sash. Each cab car has a complete locomotive air-brake system, continuous inductive automatic train control, intermittent inductive train stop, and FR speed governor. A B3B emergency brake valve is the only control equipment on the fireman's side of the cab.

Unlike the previous C&NW bi-level suburban cars which are steam heated and have Waukesha propane engines driving the generator and air-conditioning compressor, the new cars are all-electric (including heating), with power generated on the locomotive.

(Continued on page 25)

EQUIPMENT MODERNIZATION Key to Successful Railroading



National Rubber Draft Gears

on the Santa Fe



With a heritage born in the "winning of the west" and nurtured on vision, imagination and daring the Atchison, Topeka and Santa Fe exemplifies successful railroading with its continuing equipment modernization program.

Many Santa Fe freight cars and locomotives are equipped with National Rubber Draft Gears—the reliable way to provide equipment with impact protection. Today there are over 30,000 carsets of National Rubber Draft Gears in service on America's railroads—many with over 10 years and hundreds of thousands of miles of maintenance-free service. A-476A

It is the 65,500 foot-pound cushioning capacity of National MF-400 Rubber Draft Gear in your *conventional* 24⅝ inch gear pocket that reduces center sill stress as much as 42%, thus giving greater protection to the car structure from damaging impacts.

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868

Transportation Products Division
Cleveland 6, Ohio

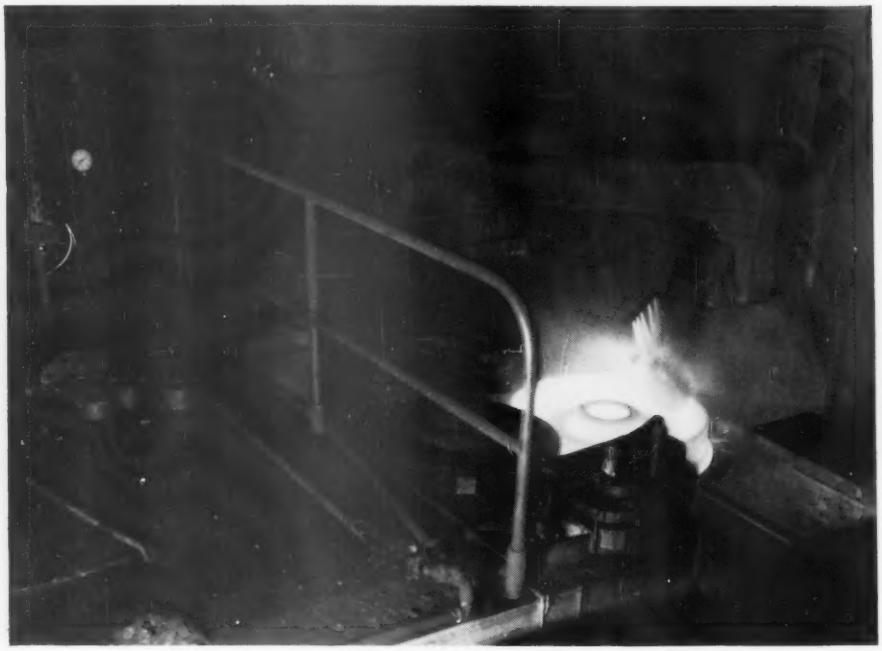
International Division Headquarters
Cleveland 6, Ohio

CANADIAN SUBSIDIARY
National Malleable and Steel Castings Company of Canada, Ltd.

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • JOURNAL BOXES

Because Armco Wheels are rolled

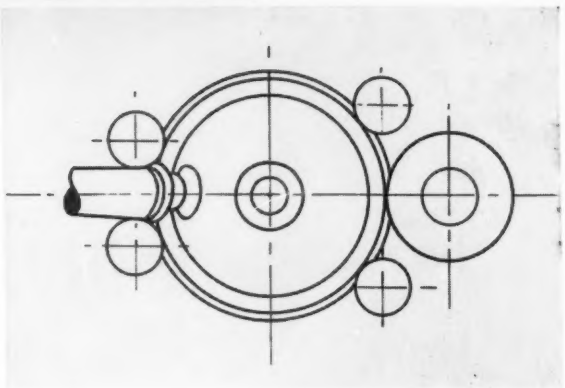
they keep rolling longer



New steels are born at Armco

Powerful rolling pressures impart greater strength and toughness to wheels during working to final size.

From 1932 to 1957, Armco shipped more than one million one-wear wrought steel wheels. Only six of these have been reported defective. This is 99.9994% performance. Forging is one big reason. Here's another:



Armco Wheels are rolled

After forging, every Armco Wheel is rolled in a powerful mill. Flange and tread contours are formed and wheel diameter reaches final size. But equally important, as mighty forces knead the steel it becomes stronger and tougher—develops even greater resistance to wear, shock and pounding.

Under your cars these durable wheels mean long trouble-free service, low lifetime cost, greater dependability, more safety. For price and delivery information on Armco Wrought Steel Wheels, call your nearby Armco Sales Office or write: Armco Steel Corporation, 2939 Curtis Street, Middletown, Ohio.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

(Continued from page 22)

In this, they duplicate the arrangement of the bi-level "400" streamliner coaches put in service by the C&NW last year (RL&C, Nov. 1958, page 32).

Train power comes from a diesel-driven alternator on the locomotive. This 480-volt, 450-amp, 3-phase Marathon alternator and its 575-hp Cummins engine are installed in the space formerly occupied by the steam generator on the locomotive. Maximum connected load for a nine-car train is 369 kw. Trainline capacity on each car is 900 kw.

The diesel locomotive also supplies the 74-volt (battery) power to the cab car control circuits and to the train control m-g set. Control circuits are carried through a 27-wire trainline throughout the train. Detachable 27/27-point jumpers are used between the cars and between the locomotive and cars.

After the air brakes on a cab car have been set for a "push" operation, (same procedure used in changing ends on a multiple-unit diesel locomotive), the control, fuel pump, engine run and generator field switches in the cab car are closed. Locomotive response is the same as it would be if these things had been done in the locomotive cab. With the reverse lever in proper position, the throttle is advanced to No. 1 position. This energizes the GF, FO and RE wires which apply power to the locomotive. Advancing the throttle further energizes the AV, BV, CV, and DV wires in combination to give full horsepower to the train.

The ground relay on the locomotive has been arranged to reset automatically when any ground which develops has been removed, or when the generator voltage has been reduced sufficiently to permit safe operation.

Structural members and sheathing are LAHT steel. Sub-floors are stainless steel. The underframe weldment extends from end to end of car and has an AAR Z-section center sill, formed-angle side sills, box section bolsters and Z- and channel cross-members. A built-up welded draft gear and coupler pocket is provided at each end of the car with built-up welded vertibule entrance steps and platforms at the center. Between bolsters the center sill are two AAR A-26, 31. 3-lb-per-ft sections with top flanges are welded continuously, giving a total area of 18.4 sq in.



Interiors of these bi-level coaches are finished so that they will require no painting. Stainless steel, annodized aluminum, and plastics are used throughout the two passenger compartments.

The side frames are Pullman-Standard's welder girder construction with the upper and lower side sheets joined by Huck lock bolts. The side frame inner frame weldment consists of horizontal and vertical members of rolled and formed zee, channel, and angle sections. Built-up welded box-section members with reinforcement plates are provided at the center entrance openings. Outer side sheets have butt-welded joints and are attached to the frame principally by spot-welding.

Ends of the car are flat. The end framing consists of rolled H-beam main end posts, rolled channel corner posts, formed Z intermediate posts, and formed channel anti-telescoping members. The turtle back roof is continuous from end to end of the car. Roof framing consists of formed Z purlines and formed channel carlines. Roof sheets are applied transversely and are attached by arc-weld at butt joints on each carline.

The floor, roof structure, ends and side walls (except below lower windows) are insulated with 3 in. of ¾-lb Fiberglas. Below the lower windows back of the resistance heaters, the insulation is 2 in. thick, faced on one side with aluminum foil. Inside surfaces of all roof, side and end sheets, and of the false floor sheets are sprayed with a 1-in. thickness of Minnesota Mining EC-244 protective coating. The upper deck main air duct is insulated with ½-in. Celotex. Lower air ducts, which are under the floors of the upper level galleries, are not insulated. Branch air ducts are lined with ½-in. Fiberglas, one side covered with asbestos paper.

Electrical Loads

	Voltage	Cab car, kw	Trailer, kw
Lighting	120	3.928	3.962
Controls	120	4.924	1.024
Heating	480	35.0	35.740
Blower fans (2)	480	2.040	2.040
Cooling load	480	20.480	20.480
Total connected load		65.672	61.206
Maximum total load possible due to controls		...	40.120

Air Conditioning

Two 8-ton Trane self-contained air-conditioning units, each complete with Freon compressor, evaporator, and condenser, are applied in the ceil-

(Continued on page 28)

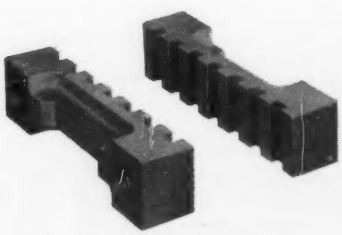
RAILROAD BEARINGS are MAGNUS' BUSINESS



Today, and tomorrow too,
you can bank on Magnus to give you
the bearing performance you want
at a price you can afford to pay!



Magnus Solid Journal Bearings



Magnus R-S Journal Stops



Magnus Traction-Motor Support Bearings



YES, Magnus is in the railroad bearing business—has been almost from the days of the Tom Thumb! And during this century of specialized service, Magnus has pioneered many significant advances in bearing metallurgy and design—to provide better bearing performance at lowest possible cost.

For example, the recently-introduced Magnus R-S Journal Stops have given railroads the first truly low-cost solution to the hot-box problem. By taking the "slop" out of the journal box, R-S Journal Stops prevent excessive displacement or lifting of the bearing—even under the most severe braking and switching impacts. They increase bearing life 200 per cent, reduce wheel flange wear, protect dust guards—cut operating costs all along the line. Magnus lubricators provide another important link in the chain of improved bearing performance. And in diesel-electric and electric locomotives and MU cars, modern Magnus traction motor support and armature bearings assure trouble-free mileage between motor overhauls.

And Magnus is keeping a weather eye on the *future*, too. With this background of railroad experience, Magnus is continually developing and testing new designs of journal box components for still greater efficiency and economy in railroad service. Whatever the future may hold, of this you can be sure. Tomorrow's rolling stock will ride on Magnus bearings—bearings that are *right for railroads* in performance and in cost. For further information on Magnus bearing products, write to Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4.

MAGNUS METAL CORPORATION
Subsidiary of **NATIONAL LEAD COMPANY**

(Continued from page 25)

ing at the center vestibule with each unit supplying half a car. Total air supply for each unit is 2,400 to 2,600 cfm. Rating is based on 25 per cent fresh air with an outside temperature of 100 deg, an inside temperature of 78 deg, and 50 per cent humidity. The air-conditioning units are controlled in conjunction with the heating system and operate on 480-volt, 3-phase, 60-cycle current with controls on 120-volt a.c.

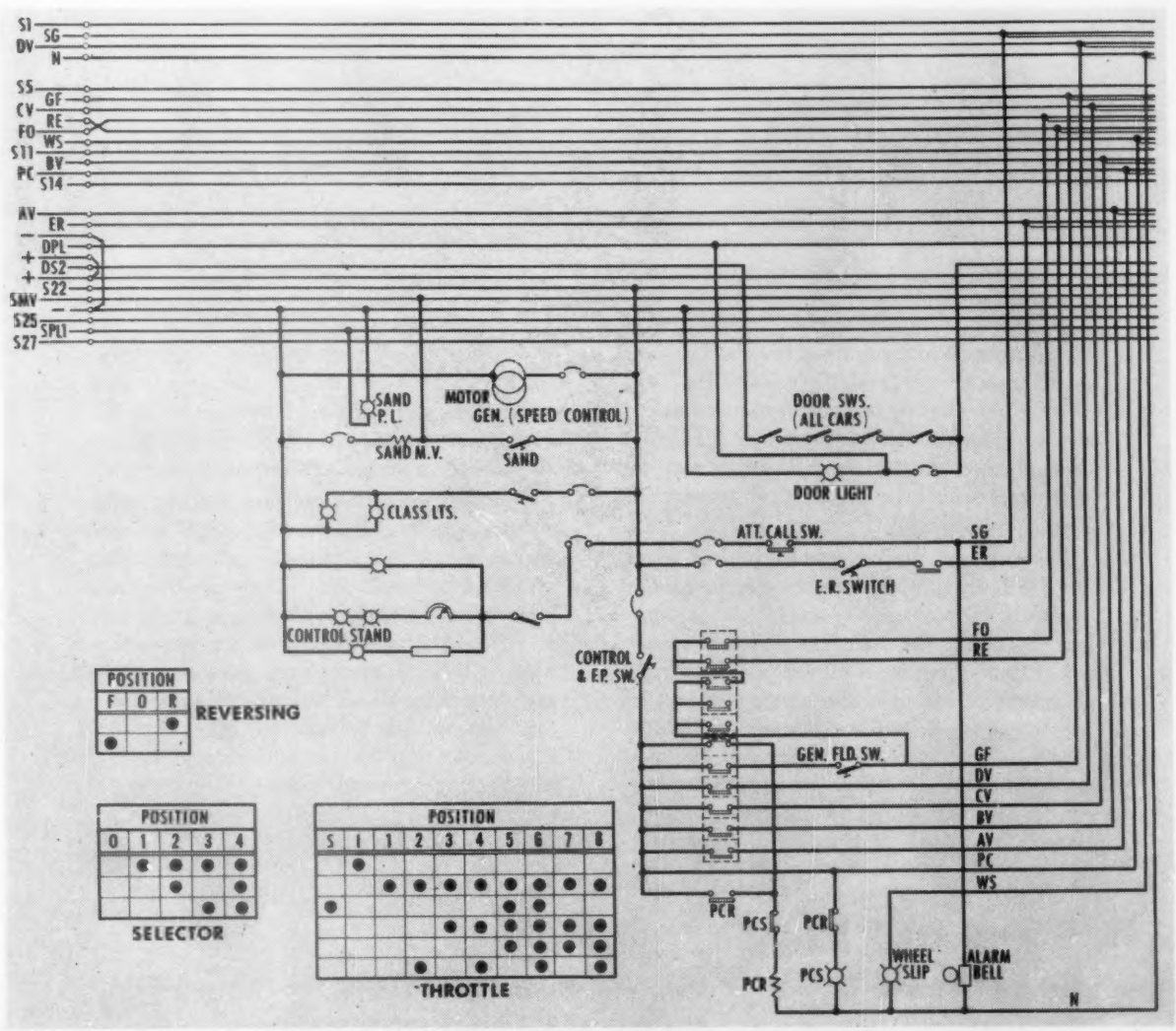
The air duct system in each coach section consists of a single center ceiling duct and two ducts, one on each side of the car, built into the upper level floors for distribution of air to lower level. Ducts extend the full length of each passenger compartment with each upper level duct connected at the inner end to one of the air-conditioning units. At the end of the car, the upper level duct is connected to the two lower level ducts. At each end of the car are two static exhaust ventilators. Each cooling unit is equipped with filters located just ahead of the evaporator-blower unit. The two passenger compartments have separate thermostats.

The all-electric heating system operates on 480-volt current with total heater capacity approximately 24 kw per car. Strip heaters behind stainless-steel guards supply floor heat along each side wall at the lower-level floor line. Overhead heat is furnished by resistance units in the main air ducts. The overhead and floor heaters are connected either "delta" or "wye" by the controls so that the total heating load per car cannot exceed 35.74 kw maximum for trailers and 44 kw maximum for cab cars.

(Continued on page 30)

27-Wire Trainline for M-U operation

Wire	Function
OS	Not used
SG	Signal
DV	"D" solenoid
N	Negative
TS	Not used
GF	Generator field
CV	"C" solenoid
FO	Reverser, forward
RE	Reverser, reverse
WS	Wheel slip
BV	"B" solenoid
PC	Power control
SN	Not used
AV	"A" solenoid
FP	Fuel pump
J	Cummins hot engine alarm
B-	Battery negative
DPL	Door pilot light
B plus	Battery positive
DS2DS1	Door interlock circuit
B plus	Battery positive
SA	Sanding
B-	Battery negative
L	Safety circuit
SPL-1	Sander pilot light
M	Alternator paralleling
CC	Not used



Controls of cab car duplicate those of EMD locomotives. Added control functions were also provided in the 27-wire trainline.



PROVEN BY MILLIONS OF MILES...KEEPS ENGINES CLEANER!

A routine engine check between oil change intervals will give you an indication of the superior performance of Diol RD. Oil screens are clean. Oil coolers are free from sludge and contamination that restrict flow. Diol RD stands up to heat and oxidation.

Millions of miles of day-to-day service have proved Diol RD gives longer life to rings, pistons, bearings and other moving parts. Diol RD contains special detergent additives that reduce carbon and varnish accumulations that cause ring breakage and premature wear. Anti-wear additives, designed for high-output service, protect heavily loaded parts against friction and scoring. And because Diol RD additives remain effective after long periods of service, normal oil make-up is sufficient to maintain its outstanding lubrication action.

Technical assistance is readily available through your Esso representative. For more information, write: Railroad Sales Division, Esso Standard Oil Co., 15 West 51st Street, New York 19, N. Y.

Esso

RAILROAD PRODUCTS

In Industry after Industry..."ESSO RESEARCH works wonders with oil"

(Continued from page 28)

The heating system will maintain a 60-deg car temperature with outside temperature of minus 10 deg. Fresh air and exhaust openings are in the roof and sides of car. Each fresh-air intake has a solenoid operated air damper. Cabs have two manually operated electric heaters which also defrost windshields. An electric heating element gives anti-freeze protection at the bottom of the center vestibule side entrance doors.

Colored vinyl, stainless steel, and anodized aluminum are used for inside finish. There is no interior painting. Stainless steel is used for the vestibule walls and ceiling, aisle doors, side and end doors, walls of stairways to upper levels, trim edge of upper seat platform, trim of wing partitions, and for lavatory interiors. Lighting is continuous fluorescent type. The windows are extra large and have heat-absorbing glass, with graduated tinting so no shades are required.

Partial List of Suppliers

Trucks	General Steel Castings
Roller bearings	Timken Roller Bearing
Brake equipment	Westinghouse Air Brake
Cobra brake shoes	Railroad Friction Products
Hand brakes	Ellcon-National
Draft gear	Waugh Equipment
Coupler operating mechanism	National Malleable & Steel Castings
Train control equipment	General Railway Signal
Batteries	Thomas A. Edison Industries
Trainline power cables	Kaiser Aluminum & Chemical
Receptacles and jumpers	Joy Manufacturing Pyle-National
Lighting fixtures	Translite
Heating system	Vapor Heating
Air conditioning	Trane
Air filters	Farr
Return air grilles	Barber-Colman
Air diffusers, headlights	Pyle-National
Window sash	Adams & Westlake
Insulation	Pittsburgh Plate Glass
Protective coatings	Minnesota Mining & Manufacturing
Vinyl coated interiors	United States Steel
Seating equipment	Heywood-Wakefield
Seat coverings	United States Rubber
Floor coverings	Goodyear Rubber

Trainlines

The power trainline is 3-phase, 480-volt, 1,200-amp, consisting of 12 aluminum cables (four per phase), rubber insulated with a neoprene sheath. The cables are grouped and secured openly beneath the cars. Connection between the cars is made by four trainline jumpers and receptacles each having three main power and three control contacts. The main power contacts extend beyond the control contacts so that the main contacts make before the control contacts when coupling, and break after the control contacts on uncoupling. The control wires form a series loop throughout the entire train. If one of the jumpers between cars should fall out, a relay in the locomotive will drop out, cutting off power from the entire train. This arrangement also protects the power contacts from burning up if the jumper is inadvertently pulled before the power is cut off at the locomotive. Other trainlines are an 8-wire cable for side-door operation and the 27-wire cable for m-u operation.



Cables feeding a-c through push-pull trains are secured openly under cars. Front-end power generation and absence of steam heat make the 26-C brake valve almost the only piece of under-car equipment.

Two electric lockers per car for emergency power supply equipment —one in "A" section and one in "B" section—are located under the stairs leading to the upper level. The "A" section has a 12-volt nickel-iron-alkaline battery in two 5-cell trays. "B" section has the charging unit, consisting of a rectifier with power failure relay, voltage sensitive charging relay, pilot light, and necessary controls. Lighting and power switchboards are in each locker, also temperature control, heat contactor and a.c. control panels.

Trailer cars are equipped with 26 brake equipment, including a 26-C control valve suitable for four-wheel trucks with individual package brake units and flanged Cobra shoes. In addition to the 1¼-in. brake line, the cars have a 1-in. main reservoir line which supplies two 20- x 72-in. main reservoirs on the leading cab car. A 10- x 15-in. reservoir tapped off the auxiliary reservoir, along with choke and B1 governor, permits operation of the new cars with the "400" bi-levels. This equipment powers the side door engines, air for which is supplied from the 1¼-in. brake trainline. Cab cars have 26-L brake equipment, which includes a 26-B-1 brake valve and a 220-cu in. equalizing reservoir. Electric buzzers take the place of air signal equipment and the train signal line.

The E-8 units which power the "push-pull" trains were converted at the C&NW shops. The skid mounted 300-kv diesel alternator set can be removed from the locomotive as a unit. Its fuel is taken through the original steam generator piping. Total fuel supply on the locomotive was increased by 2,200 gal by making the former boiler water tank into an additional fuel tank. The suction pump was lowered to the bottom of the fuel tank and connections established between the two tanks. The original battery boxes were removed and a new battery box built in the original steam generator compartment. It accommodates eight trays of MGD-13 batteries.

A special control cabinet installed in the steam generator compartment contains all relays and controls for starting, excitation control, and automatic paralleling of two or more alternators. The hatch opening over the generator compartment was altered to accommodate an F-7 dynamic brake hatch which has been rebuilt as a radiator for the auxiliary engine. Grids were replaced with the cooling cores, and two 7½-hp, 74-volt d.c. motors and fans take the place of the original braking fans. These fans are powered from the auxiliary generator on the locomotive. The addition of the alternator, diesel engine, controls and other components brought the total weight of the locomotive to 337,200 lb, an increase of approximately three tons.

The equipment for the new "push-pull" operations cost $5,600,000. While the locomotives and cars are almost conventional, the extras built into them are expected to make "push-pull" trains almost as flexible as RDC and multiple-unit electric trains. It is expected that C&NW commuter service will now have the operating advantages found in electric m-u operation. These include immediate availability of trains for return movement, greater flexibility of train size and reduced need for terminal switching.

Better Diesel fuel economy

New Electro-Motive Needle Valve Injector

New fuel savings for General Motors locomotives containing 567 series engines is now possible with the new higher efficiency Electro-Motive needle valve fuel injector.

Two important advantages. Incorporating a differential needle valve arrangement, the new injector provides these advantages over present spherical valve injectors:

- *Improved initial automization for better combustion, higher thermal efficiency*
- *Reduction of wasteful after-dribble to lower specific fuel consumption*

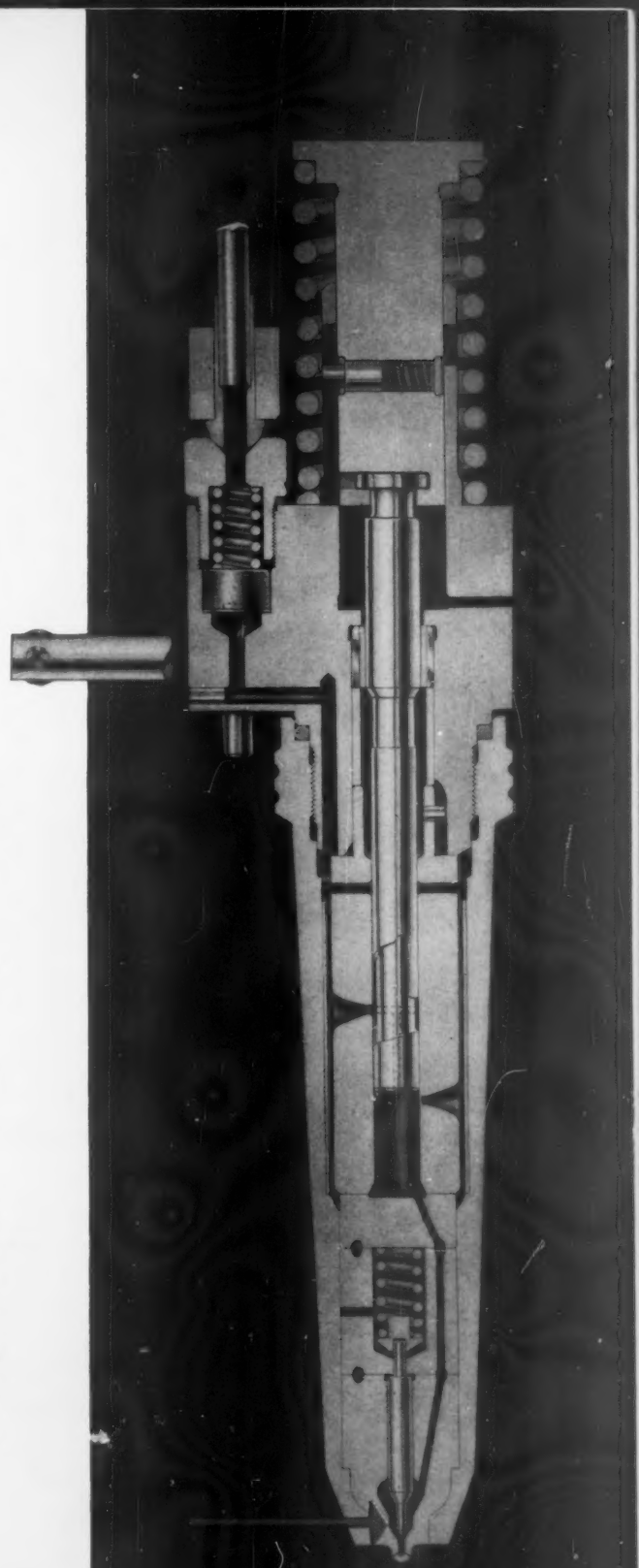
With better combustion, there is less carbon deposit and the resulting higher thermal efficiency provides more useful power from each injection. The higher efficiency combined with reduced after-dribble provide increased savings in specific fuel consumption.

Old injectors converted. Spherical valve injectors in use on General Motors locomotives may be converted through Electro-Motive facilities to the new needle valve type. For details, contact your Electro-Motive representative.

GENERAL MOTORS LOCOMOTIVES

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

La Grange, Illinois • Home of the Diesel locomotive
In Canada: General Motors Diesel, Ltd., London, Ont.

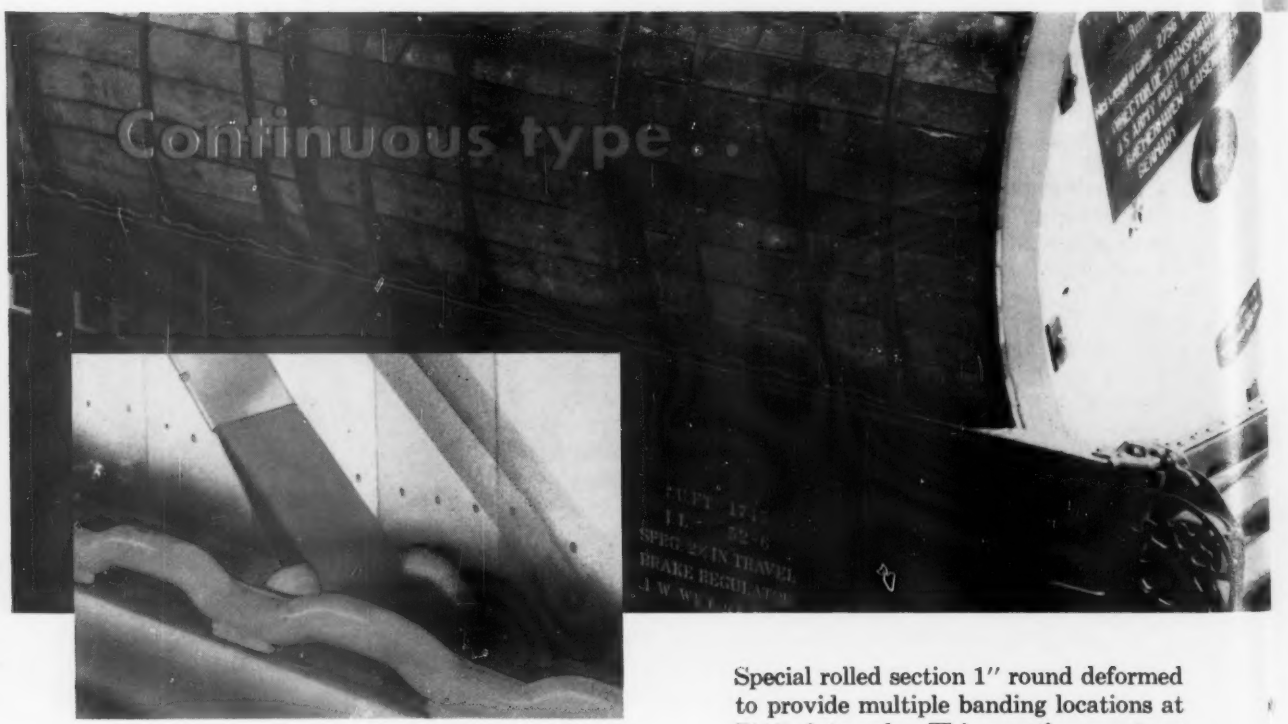


DIFFERENTIAL NEEDLE VALVE
Location of valve seat close to spray tip reduces after-dribble (fuel trapped between spray tip and valve) to absolute minimum. Increased valve pressure possible with new needle valve, insures complete automization for higher thermal efficiency of injected fuel.

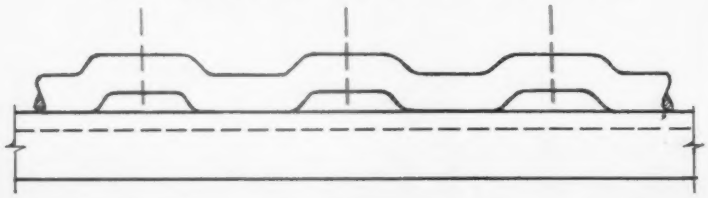
LADING BAND ANCHORS

Designed for Maximum Utility

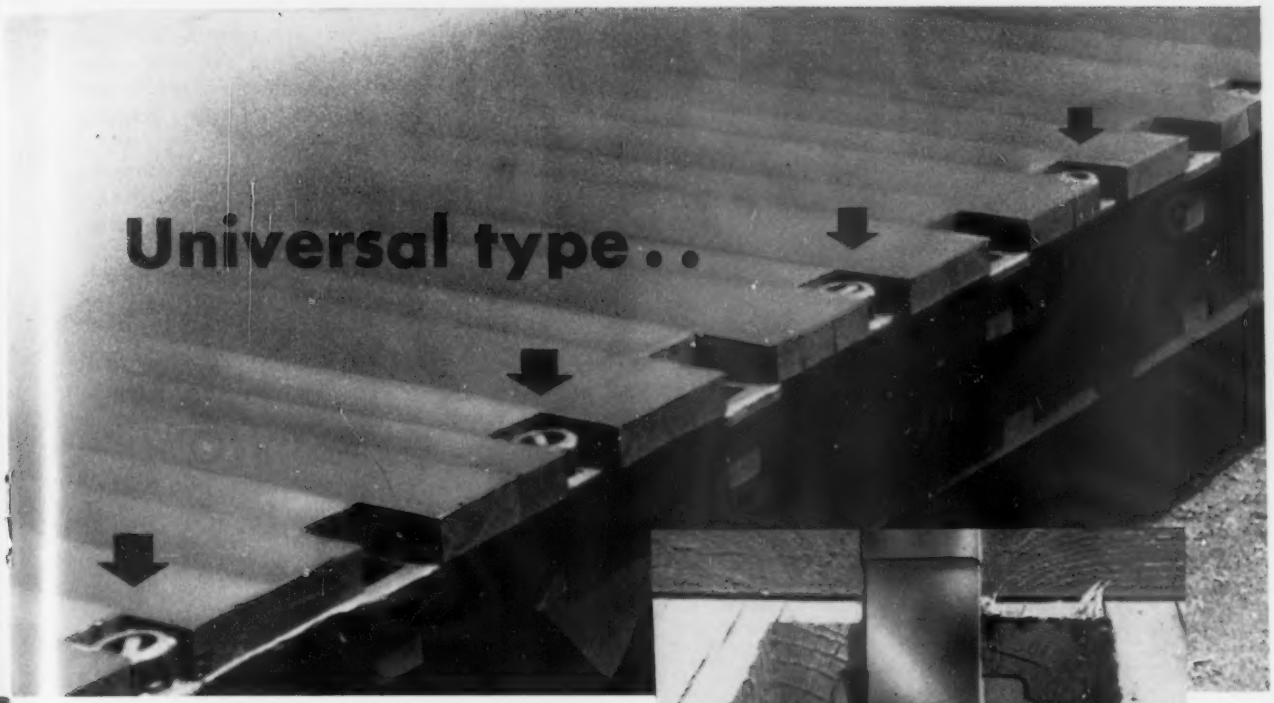
Designed especially for both gondola and flat car application. Welded to position, both types afford easy band access and fully rounded contact surfaces.



. . AN ANCHOR EVERY 7½ INCHES

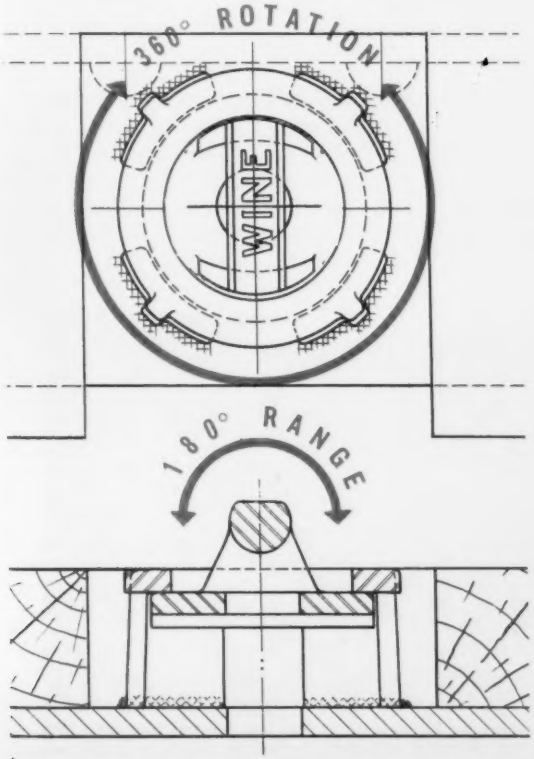


Special rolled section 1" round deformed to provide multiple banding locations at 7½" intervals. This continuous type anchor is best adapted to the top coping of gondola cars. Composite lengths available for various car design requirements. Individual cast steel anchors for end strapping complete the application.

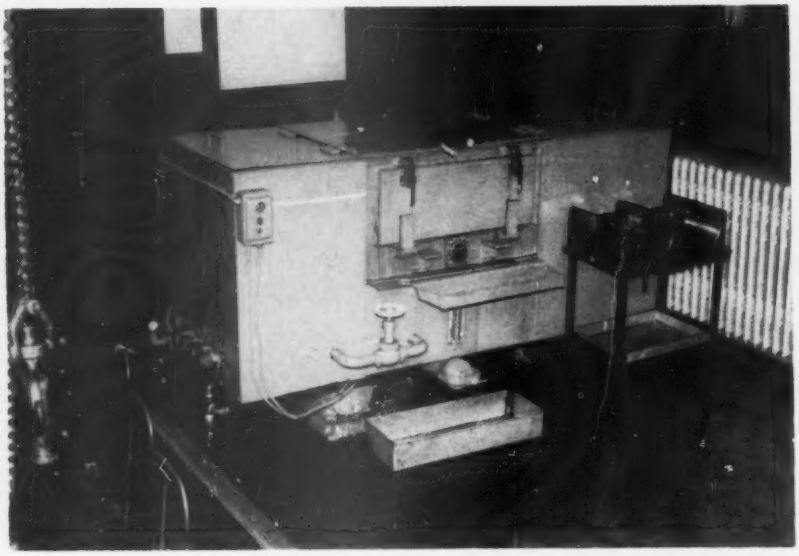




Electric cast steel with an unlimited range of adjustment in two planes the universal type anchor is best suited for flat car floors and drops flush when not in use. Multiple application of the universal type affords anchorage from any angle.







Machine at Greenville (Jersey City, N.J.) washes pads removed locally and those from three other New York City area car-repair points. Two other washers are located in the New York Region—lines northeast of Philadelphia. One is at Morrisville, Pa.; the other, at South Amboy, N.J.

How Pennsy Reclaims Lubricators

Machine offered to AAR members is used at 34 PRR repair points

RENOVATION OF PAD LUBRICATORS on the Pennsylvania is being handled by 34 washing machines located at all the larger car repair installations. All of the machines are of the same design developed by the PRR mechanical department about two years ago.

After the pilot model was built, it was tested for several months. Assured of its practicability, the PRR then built 33 additional machines which have gone to all the road's major car shops. Repair tracks with small repack schedules are furnished with cleaned lubricators from one of the region's larger shops with a washing machine.

The machine consists of three tanks within a single housing which has an overall length of 6 ft 7¾ in., an overall height of 3 ft 10¾ in., and a width of 2 ft 2 in. Facing the front of the machine, the oil heating tank is at the left, the washing tank at the center, and the lubricating (saturation) tank at the right.

Washing Drum

Heart of the machine is the 2-ft 4-in. O.D. washing drum. This drum is covered with wire netting with 1½-in. openings. It is divided into four segments with a series of lengths of ¼-in. pipe welded to the four "spokes" at each end. Four compartments are formed and each will hold two lubricators, side by side, with room for them to roll over as the drum rotates.

The drum, its shaft mounted on roller bearings, is driven by an air motor. Washing is done at a speed of 30 rpm through a hot oil bath for 5 min. This washing oil is then pumped from the washing tank and the drum speed is increased to 600 rpm for 5 min to spin-dry the pads. Use of the same drum for washing and drying simplifies handling problems and speeds the renovation process.

Heated oil is supplied from the tank at the left of the machine. This 55-gal compartment is fitted with four immersion heaters of 800 watts each. It also has two sock-type discharge filters. Oil flows to the washing tank

(*Continued on page 38*)



Oil level in washing tank is checked on sight gage and adjusted with globe valve on front of machine. Load in washing drum must be balanced by placing two pads in each quarter section.



Pads are checked on height gage as they are removed from the washing drum. They are then placed in barrels for shipment, or go into saturating tank to be prepared for installation in cars.



BETTER FILTRATION BY FAR... AND THIRTY EXTRA DAYS BETWEEN CHANGES TO SAVE MAINTENANCE DOLLARS!

"Why do you claim only 30 days longer service life for WIX Prescription Filtration of Diesel Fuel?" asks a WIX user. *"Our filters have completed 60 days – the oil's as clean as a whistle and there's no pressure drop."*

WIX claims are on the conservative side. The team of WIX Primary and 2nd Stage Fuel Oil Cartridges provides big savings in filter cost per mile and labor cost servicing filters. But, these savings are only a drop in the bucket compared to what you save with WIX in elimination of Fuel Injection troubles, reduction in Diesel Engine wear and attendant loss in efficiency.

Here's an economy source you may have overlooked. Get the facts on WIX Lubricating and Fuel Oil Filter Cartridges. Write for the new WIX Catalog No. 200 today.

wix® FILTERS

WIX CORPORATION • GASTONIA, N. C.
In Canada: Wix Corporation Ltd., Toronto

SALES OFFICES: Jacksonville, Fla. • New York, N. Y. • Chicago, Ill. • St. Louis, Mo. • St. Paul, Minn. • San Francisco, Cal.
WAREHOUSES: Gastonia, N. C. • New York, N. Y. • St. Louis, Mo. • Des Moines, Ia. • Sacramento, Cal.


SINCO
CAR OIL
#355

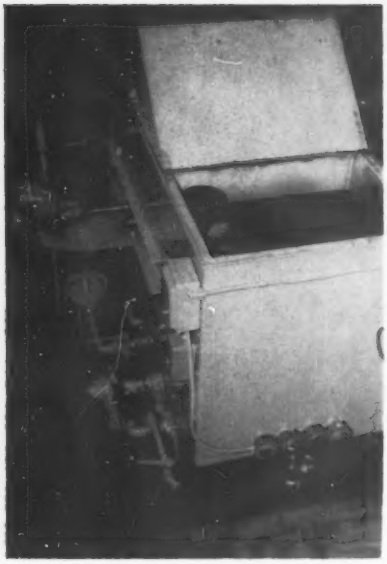
A Revolutionary New Premium-Type Car Oil to Help You Cut Costly Delays Due to Hot Boxes

Field and Laboratory Tests Prove that Sinco Car Oil #355, Compounded from Natural High Quality 100 Plus V.I. Oils (No V.I. Improver), Gives You Important Advantages.

1. All-weather protection – will not congeal in cold weather nor thin out under heat.
2. Better oil cushion between bearing and journal.
3. More rapid flow through waste or pad to guarantee instant lubrication.
4. Anti-rust and oxidation inhibited.

For additional information, contact Sinclair Refining Company,
Railway Sales, 600 Fifth Avenue, New York 20, New York.
Chicago • St. Louis • Houston.

Sinclair Railroad Lubricants



Driving air motor is at rear of tank. Immersion heaters are at base of heating tank (foreground). Thermostat is at rear of compartment.

(*Continued from page 34*)

by gravity and is pulled back through a pair of perforated screen strainers by a gear pump of 12-18 gpm capacity driven by a 1-hp electric motor.

Oil is kept at 220 to 240 deg F by thermostatic control of the immersion heaters. At this temperature, all water will be removed from pads. About ½ gal of oil is removed from each pad during reclamation. To avoid overflowing the tank, oil must be drained from the heater tank periodically.

Pad Inspection

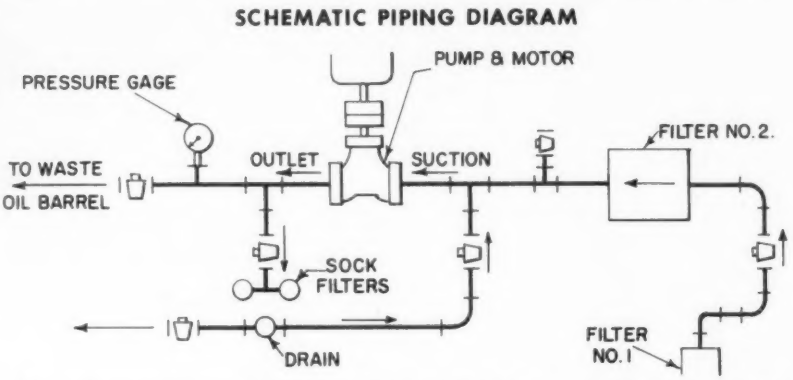
Following washing and spinning, pads are inspected for rips and other defects. If found defective, they are sent to Altoona shop for sewing and other repairs. Undamaged pads are checked for resilience on the AAR height gage. If pads are to be shipped to outlying repair tracks, they are then loaded in barrels dry. Points of use have saturating tanks where the pads are made ready for installation.

The right-hand compartment of the washing machine is a saturating compartment containing a wire-screen drum. This drum is almost completely immersed in 120-deg F oil and is rotated at 30 rpm by an air motor. This speeds the saturation process. Immersion alone requires 8 hr, while rotation and immersion will complete the saturation in 8 min.

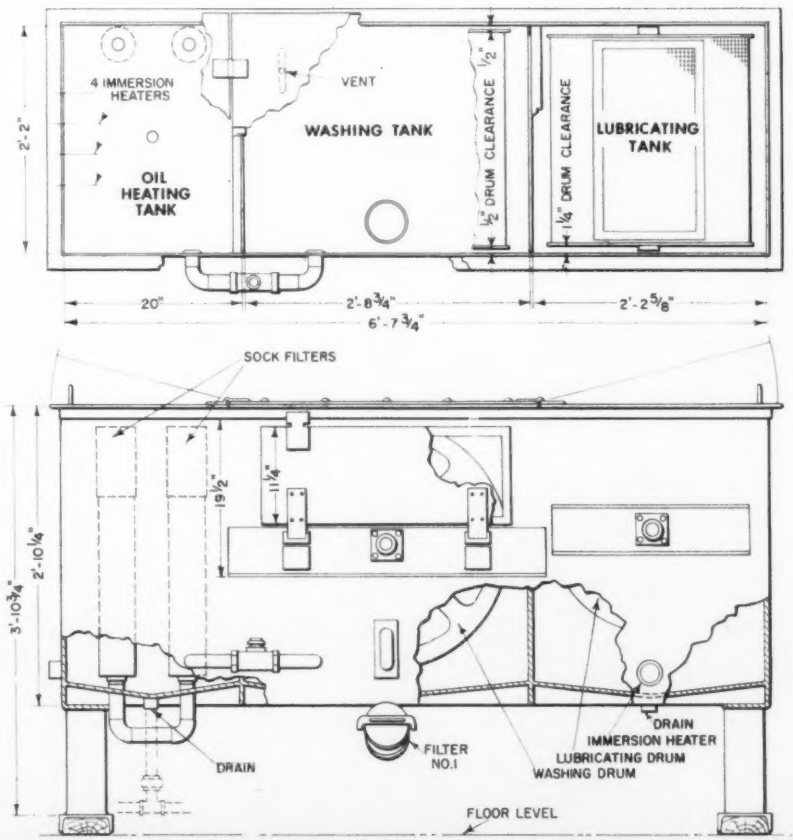
Lubricating devices can be cleaned and saturated to capacity in less than ½ hr in this machine if no repairs are necessary on cover or core. During the past few months almost a dozen roads have requested PRR permission to build this machine, and several have already done so.

The Pennsylvania has announced that the design, on which patents are pending, will be made available to any railroad or private car-line operator without cost. The machine must be built by the user only for the purpose of reclaiming his own lubricating devices.

In a recent circular letter referring to this machine, the AAR pointed out that "the benefits to be obtained from machines of this nature located at all of the larger repair points on any road should be quite obvious. The majority of lubricating devices could be given proper attention at the points at which lubricators are removed and much could be saved in handling and shipping costs."



Piping arrangement was altered after some machines were put in service. Change provided additional filtering capacity, which was important to speed reclamation operations.



Tanks of pad washing machine are made of ⅛-in. steel. Loading door has commercial refrigerator hardware. The 34 machines were built at PRR's Altoona Works.

An important announcement to railroad operating and maintenance officers . . .

Mobil railroad research designs a new Diesel Engine Analyzer that shows, not one, but eight cylinder patterns at the same time!

Maintaining locomotive diesel engines at peak efficiency is a continuous problem confronting railroad mechanical officers. The heart of this problem has always been to identify malfunctioning assemblies and to determine the causes.

To accomplish this in multiple cylinder engines with existing equipment is complicated and time consuming. With any of the electronic pressure pickups now available, compression and firing pressures and injection timing can be determined for only one assembly at a time. The same pressure device must then be used successively for all other assemblies to obtain valid comparisons of their performance.

Now, from Mobil Railroad Research, comes the Diesel Engine Analyzer. This new instrument, presently under field test, is designed to provide all necessary information for, not just one, but eight assemblies at once. Basically, it is an oscilloscope which can show eight assembly patterns in parallel positions, indicating fuel injection timing and cylinder pressures in relation to piston position. (It does not trace a complete pressure-time plot at any one time, but rather shows when pressure rises above a pre-selected point. This point may be easily varied by the operator to obtain complete pressure-time plot data for all eight cylinders.) Because the design of this new instrument can permit the analysis of eight assemblies at one time, it greatly speeds up the work of engine trouble-shooting. If the engine has been previously prepared, the instrument can be attached in the time needed to connect the unit to the load box. An analysis can be completed in four hours or less.

To prepare an engine for analysis:

1. A number of timing indicators are installed on the flywheel. As the wheel turns, these indicators activate adjacent magnetic pickups and the pulses that result are converted by the analyzer into the base pattern of eight lines on the scope face. Blips on the top and bottom pattern lines indicate piston position at Top Dead Center and at other desired locations before and after TDC, and serve as reference points for all eight pattern lines.

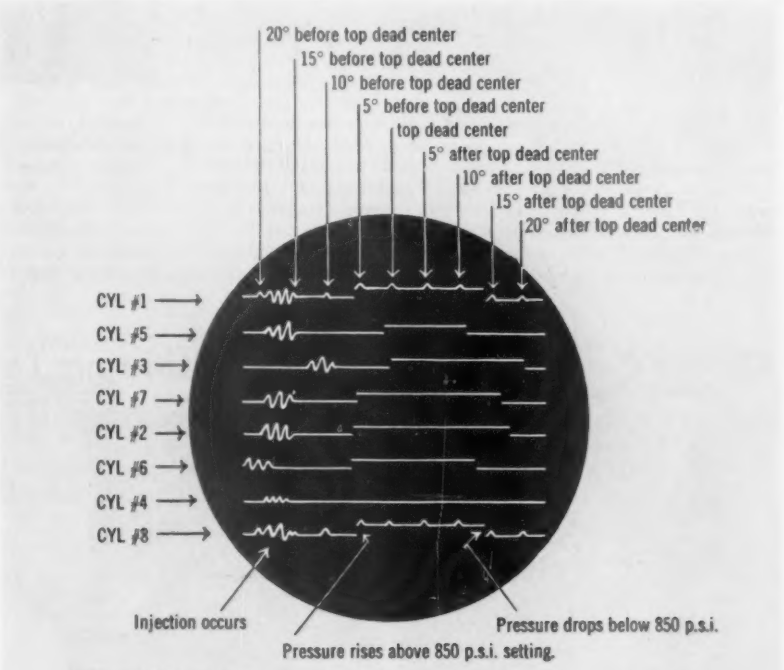
2. Vibration pickups are then installed adjacent to the injectors. When injection occurs, vibration is recorded electronically on the appropriate pattern line.

3. Finally each cylinder is fitted with a balanced pressure pickup which is self-calibrating so that results from all cylinders are comparable. Pressure changes are shown as breaks in the pattern lines.

This unique Diesel Engine Analyzer is now under development at Mobil Research. Perfected, it will provide a practical means for pinpointing engine performance faults with data which can be interpreted and used by personnel in the back-shop or terminal. Another example of Mobil Research which goes beyond fuels and lubricants for the benefit of the railroad industry.

Parker B. Smith

RAILROAD DEPARTMENT MANAGER



Remarks: CYL #1—OK
CYL #5—Short line indicates lack of fuel, faulty rings, or bad valve action.
CYL #3—Late injection means incorrect injection timing.
CYL #7—OK
CYL #2—Long line indicates high peak pressure.
CYL #6—Early injection indicates incorrect timing.
CYL #4—Low vibration and low pressure indicate faulty fuel injection.
CYL #8—OK

New Diesel Engine Analyzer developed by Mobil can show electronically patterns of eight cylinders at once. A typical scope pattern for an engine with defects as noted would appear as shown here with pressure set at 850 p.s.i.

99 years of helpful association with America's Railroad Industry

Mobil

RAILROAD PRODUCTS

CAR REPAIR TIME-SAVERS

Coil Spring Press



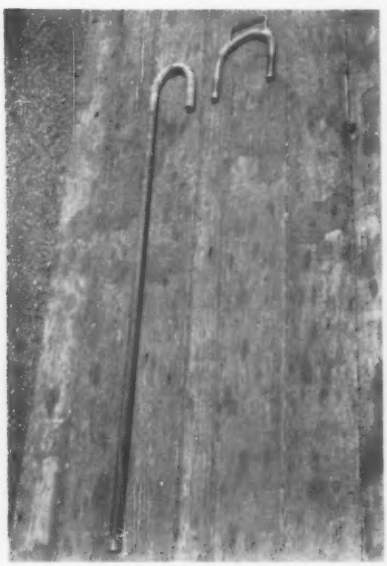
Pullman uses this press to remove and replace springs in air-brake cylinders. Three 1- x 1- x 8-in. spacer blocks welded to the ¼-in. bed plate hold piston head in position. Fitted eye bolts at the ends of the 1-in. pipe handles run through a transverse shaft which engages the upright support. Blocks keep handle assembly from slipping off cover casting. Piston assembly and push rod can be replaced in press. Compressed spring is held by the L-shaped latch over the connecting pipe between the tees.

Lifting Wheels



The Rock Island uses this wheel transfer device at its Kansas City, Kan., Armourdale shops. It consists of an air cylinder and piston, on top of which is mounted a crossbar having a tong arrangement at each end. A wheel coming in on the conveyor for boring replaces a finish bored wheel in the boring mill by swinging the device through a 180-deg turn. A lever at the center of the crossbar opens and closes the tongs to grasp wheels for lifting. Three-way valve operates air cylinder to lift and lower wheels in place.

Illinois Central Journal Box Positioning Tools







These devices are used at car repair tracks to remove and replace brass and wedges, also to apply and remove lubricator pads. The hook-shaped bar is approximately 54 in. long, with the hook having a 7-in. point and a 5-in. opening. Spot welds ¼ in. high are placed on the bottom outside of the hook to eliminate slipping when in contact with the wheel plate. The truck side is forced out to its maximum limit by placing the point of the bar against it at the journal box and applying pressure. The horseshoe device, made from ¾-in. pipe, can now be placed between truck side and hub of wheel.

LEARN AIR BRAKES WITH COLOR SCHEMATICS

AB Freight Brake Equipment — *Installment 2F*

Release Control Retainer

This is the final installment in the series on the AB brake. The fifth installment appeared in the August 1958 issue, p 29. To color sketches, use Mongol pencils.

The Release Control Retainer has the same features as the AAR standard retaining valve, plus a fourth position which affords a slowdown release of brake-cylinder pressure from 50 psi to 10 psi in approximately 86 sec. The purpose of this additional position is to provide better control of slack in long trains during release of the brakes while the train is in motion, especially over a rolling profile. Use of this position avoids the necessity for resetting retaining valves en route, especially on adverse grades. Mounted on a pipe bracket incorporating a Wabcotite fitting and attached permamanently to the car, the valve may be removed without interfering with the piping. A strainer is located in the bracket to protect the retainer chokes and valves. A wasp excluder of the flexible rubber diaphragm type is built into the body casting.

The following sketches show the exhaust of brake-cylinder air through the release control retainer in the four handle positions.

Direct Exhaust Position (Sketch 26)

In Direct Exhaust position, the handle is turned downward to the position marked *EX*. The AB valve exhaust is through the strainer, chamber *A*, passage in cock key and past the wasp excluder to atmosphere in unrestricted normal manner. To color Sketch 26, proceed as follows: With a pink pencil, start at the pressure end of brake cylinder, through the service slide valve to retaining valve, through the strainer, chamber *A*, passage in cock key and past wasp excluder to exhaust *EX*. Dampen with a brush and let dry.

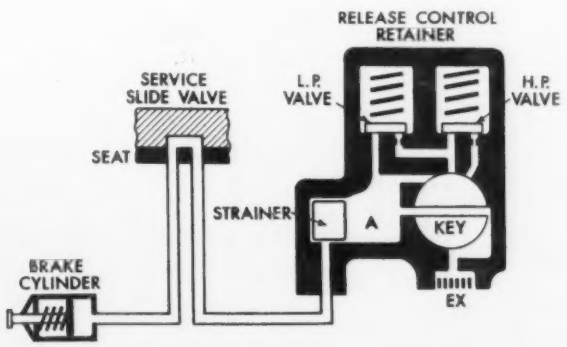
Low-Pressure Position (Sketch 27)

In Low Pressure position, the retaining-valve handle is turned to the horizontal position marked *LP*. The AB valve exhaust is through the retaining valve strainer, chamber *A*, past Low Pressure Valve, through choke *B*, chamber *D*, past port in cock key and past wasp excluder to atmosphere. Valve will close to retain 10 psi in the brake cylinder. The blow-down time of the brake cylinder from 50 psi to 10 psi through choke *b* is approximately 60 sec.

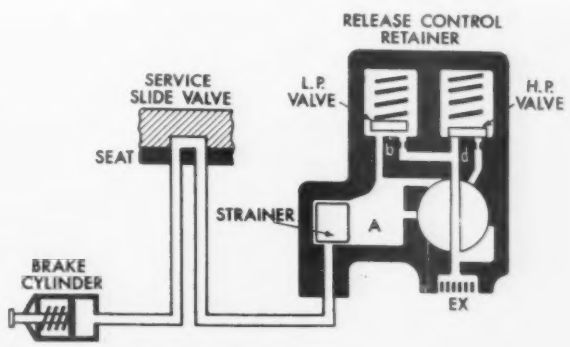
To color sketch 27, proceed as follows: With a pink pencil, fill in pressure end of brake-cylinder, passage through cylinder service slide valve, through retaining-valve strainer, and through chamber *A*, past unseated Low Pressure Valve, through choke *b*, chamber *D* (to the High Pressure Valve but not past it), through port in cock key to wasp excluder to exhaust *EX*. Dampen with a brush and let dry.

High-Pressure Position (Sketch 28)

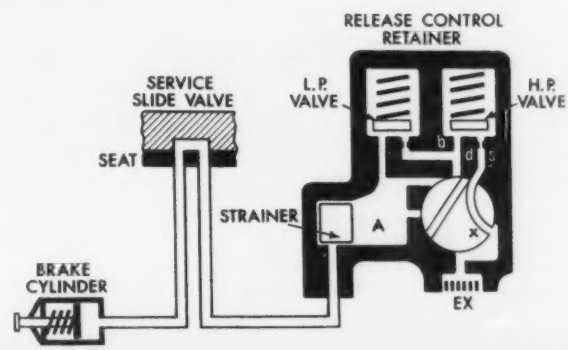
In High-Pressure position, the handle is turned to the position marked *HP*, 45 deg below horizontal. The AB valve exhaust



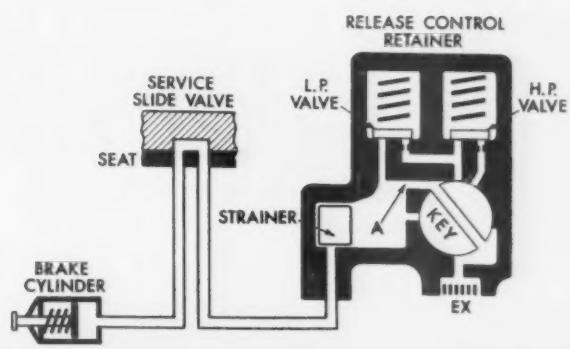
Sketch 26—Direct Exhaust Position



Sketch 27—Low-Pressure Position



Sketch 28—High-pressure Position



Sketch 29—Slow Direct Exhaust Position

is through the strainer, chamber *A*, past Low-Pressure Valve, through intermediate choke *b*, past the high-pressure valve, through final choke, passage *s*, drilled port *x* in cock key, and past the wasp excluder to atmosphere. The pressure-retaining value of each valve is 10 psi. Because the valves are in series, they will close and retain 20 psi brake-cylinder pressure. The blowdown time of brake-cylinder pressure from 50 to 20 psi through the two chokes is approximately 90 sec.

To color sketch 28, proceed as follows: With a pink pencil, fill in pressure end of brake cylinder, through ports in service slide valve, to retaining valve, through strainer, past Low- and High-Pressure Valves, through drilled port in cock key to wasp excluder to exhaust *EX*. Dampen and let dry.

Slow Direct Exhaust (Sketch 29)

In Slow Direct Exhaust Position, the handle is turned to position marked *SD*, 45 deg above horizontal. The AB exhaust is through choke *a*, port *g* in cock key, and past wasp excluder to atmosphere. The blowdown time of the brake-cylinder pressure from 50 to 10 psi is approximately 86 sec. However, brake-cylinder exhaust continues until all pressure is vented.

To color sketch 29, proceed as follows: With a pink pencil, fill in the pressure end of the brake cylinder, through the service slide valve to retaining valve, through strainer to chamber *A*, through port *a*, through cock key to wasp excluder to exhaust *EX*. Dampen and let dry.

The AB-1-B Freight-Car Equipment

The AB-1-B freight-car brake equipment is supplied for cars used in special merchandise service, but which may occasionally be operated in passenger trains. It is not intended for application to cars primarily assigned to passenger trains with infrequent operation in freight service. Such cars should have D-22-P passenger-brake equipment.

The AB-1-B brake equipment is the same as the standard AB equipment, with two additions: A Filling Piece with Selector Valve portion which is applied to the standard AB valve, and an A-2-A Quick Service Valve.

Cars having the AB-1-B valves are equipped with standard passenger Signal Car Equipment so that when the car is used in passenger or special merchandise service, the signal pipe pressure will automatically adjust the AB-1-B valve for the higher speed operation. When operating in regular freight service, the absence of signal-pipe pressure automatically adjusts the valve to provide the standard three-stage development of emergency brake-cylinder pressure.

When operating in special merchandise service, the presence of signal-pipe pressure automatically adjusts the valve to provide a direct build-up of brake-cylinder pressure in an emergency brake application at substantially the same rate as with passenger equipment.

Brake-cylinder release times are the same for either type of service as those obtained with standard AB equipment. A safety valve is provided to limit brake-cylinder pressure for service applications. Operation of the valve in all other respects is the same as that of the AB valve.

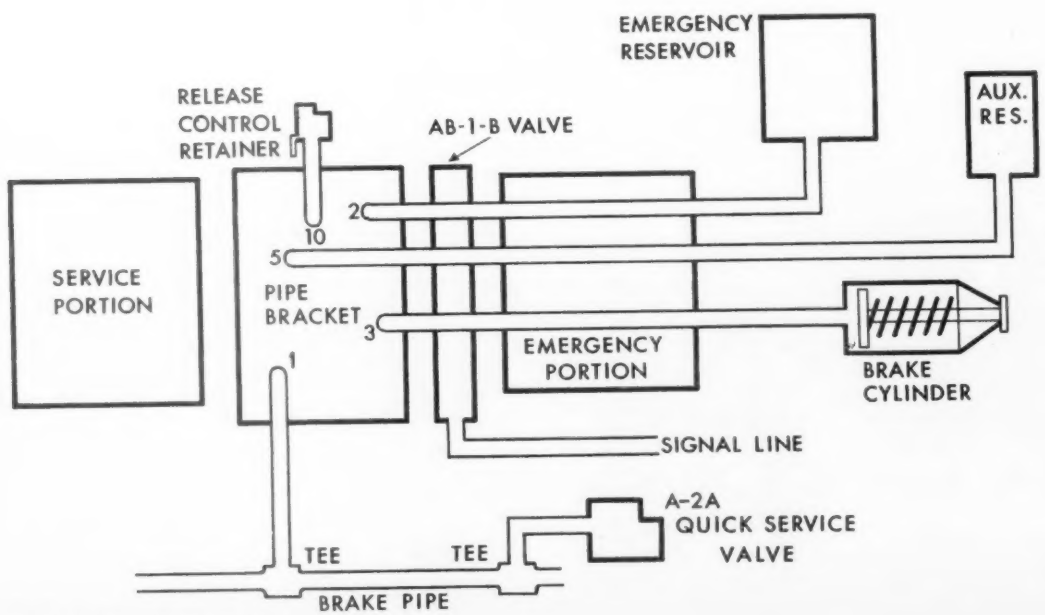
To color sketch 30, proceed as follows: With an orange pencil, fill in the emergency reservoir pipe, starting at connection *2* at the bracket and ending at the emergency reservoir. Dampen and let dry. With a dark green pencil, fill in the Auxiliary Reservoir pipe, starting at connection *5* at the bracket and ending at the auxiliary reservoir. Dampen and let dry.

With a pink pencil, fill in the brake-cylinder pipe, starting at connection *3* at the bracket and ending at the brake cylinder. Dampen and let dry. With the same pencil, color the retaining valve pipe, starting at connection *10* at the bracket and ending at the retaining valve. Dampen and let dry. With a yellow pencil, fill in the brake pipe, starting at connection *1* and ending at the A-2A Quick Service Valve. Dampen and let dry. With a dark blue pencil, fill in the space marked Signal Line. Dampen and let dry.

Fast Freight Charging Position (Sketch 31)

When operating in fast freight service, signal-pipe air charges chamber *P* through passage *S*. Pressure exceeding approximately 15 psi deflects the large diaphragm and compresses the valve spring, unseating valve *174*, thus connecting passages *C-10* and *C*. Brake-pipe air charges chamber *R* through passage *b9*, deflecting the small diaphragm and compressing the valve spring. Valve *174a* is thus unseated, connecting passage *C* to the safety valve.

To color sketch 31, proceed as follows: With a yellow pencil, color passage *b9* and



Sketch 30—Layout of AB-1-B Equipment

chamber *R* above small diaphragm. Dampen with a brush and let dry. With a dark blue pencil, color passage *S* and chamber *P* above large diaphragm. Dampen and let dry. With a pink pencil, fill in (in dashes) passages *C* and *C-10*, spaces above and below both valves, and the passage to the safety valve. Note: At this time there is no brake-cylinder air present. Dampen and let dry.

Fast Freight
Service Position
(Sketch 32)

When a service reduction is made, brake-cylinder pressure developed in passage *C* is connected to the safety valve which opens and blows down pressure in excess of its 62 psi setting.

To color sketch 32, proceed as follows: With a yellow pencil, color passage *b9* and chamber *R* above the small diaphragm. Dampen and let dry. With a dark blue pencil, color passage *S* and chamber *P* above large diaphragm. Dampen and let dry. Using a pink pencil, color passages *C* and *C-10*, spaces above and below both valves, and passage to the safety valve. Dampen and let dry.

Fast Freight
Emergency Position
(Sketch 33)

When an emergency brake application occurs, brake-cylinder air in passage *C3* will flow through passage *C-10*, past unseated valve *174* in the selector valve portion to passage *C* and the brake cylinder. This direct flow of air to the brake cylinders by-passes the inshot valve delay choke *127* in the emergency portion, and provides brake-cylinder build-up at substantially the same rate as passenger equipment. As brake-pipe pressure in chamber *R* of the selector valve portion is exhausted by the emergency application, valve *174a* is seated by its spring and cuts off connection between the safety valve and brake-cylinder passage *C*, thus permitting full development of high emergency brake-cylinder pressure.

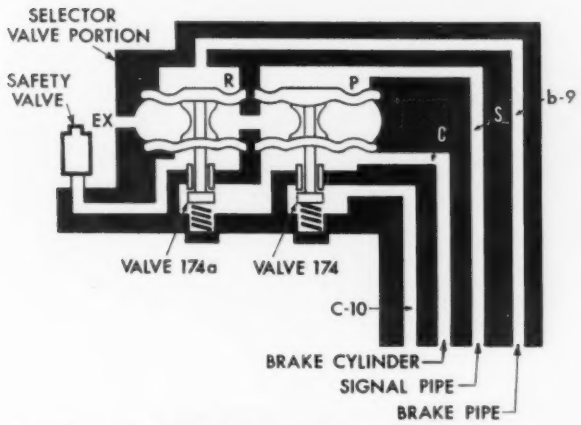
To color sketch 33, proceed as follows: With a yellow pencil, fill in (in dashes) passage *b9* and chamber *R* above the small diaphragm. Dampen and let dry. With a dark blue pencil, fill in passage *S* and chamber *P* above large diaphragm. Dampen and let dry. With a pink pencil, color passages *C* and *C-10*, spaces above and below valve *174* and only the space beneath valve *174a*. Do not color passage leading to the safety valve. Dampen and let dry.

Standard Freight
Emergency Position
(Sketch 34)

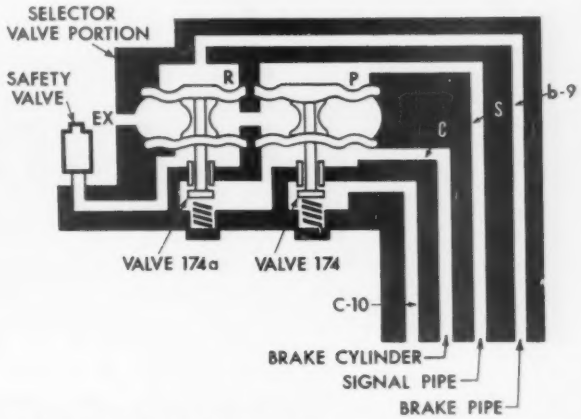
When operating in standard freight service, there is no signal-pipe pressure in chamber *P* of the selector valve portion. Valve *174* is seated by its spring, cutting off connection from brake-cylinder passage *C* to passage *C-10*. Emergency brake-cylinder pressure will build up in the three stages standard for freight service.

To color sketch 34, proceed as follows: With a yellow pencil, fill in (in dashes) passage *b9* and chamber *R* over small diaphragm. Dampen and let dry. With a pink pencil, color passage *C* and the space above valve *174* and beneath valve *174a*. Do not color passage to safety valve.

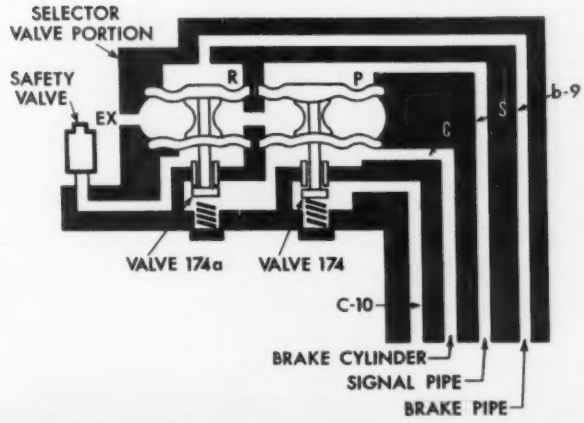
Although valve *174* remains closed, passage *C-10* and the space below valve *174* may be colored in pink, as brake-cylinder air will eventually flow into these spaces. Do not color passage *S* and the space above large diaphragm (chamber *P*). Dampen and let dry.



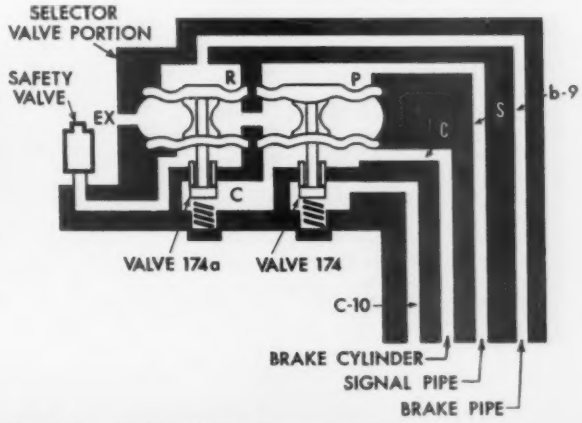
Sketch 31—Fast Freight Charging Position



Sketch 32—Fast Freight Service Position



Sketch 33—Fast Freight Emergency Position



Sketch 34—Standard Freight Emergency Position

Locomotive Feed Valves

This is the tenth installment on the 24-RL Equipment in our color schematics series. For the previous installment, see p 29 of the July 1959 issue. To color diagrams, use Mongol pencils.

D-24-B Feed Valve— Open Position (Sketch 26)

Main reservoir air from passage *30* enters the feed valve at chamber *A* and goes through a strainer to chamber *B*, then through a choke in the piston to chamber *C*, passage *30a* and chamber *D*. While the system is being charged, the regulating valve is unseated so that air from chamber *D* can flow to chamber *E*, passage *21a*, chamber *F* and discharge passage *21* to the brake valve.

Because of the choke in the piston, a pressure differential is created. The higher air pressure in chamber *B* moves the piston. This raises the supply valve off its seat and compresses the supply valve spring. Main reservoir air can then flow direct from chamber *A* past the unseated supply valve to chamber *F* and passage *21* to the brake-valve rotary valve in Running and Controlled Release positions. The delivered air is connected back to the feed valve chamber *G* by passage *32* from the brake pipe, regulating pressure and flow of air from the feed valve to the brake system.

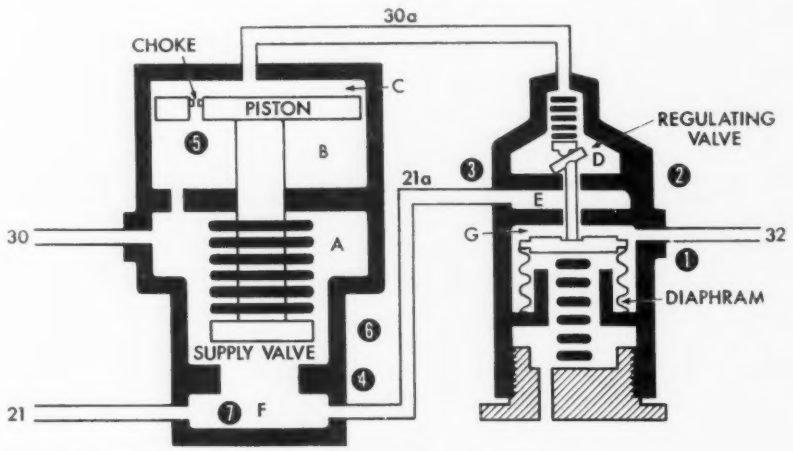
To color sketch 26, begin with a carmine pencil and color passage *30*, chamber *A* to the supply valve seat, chamber *B*, chamber *C*, passage *30a*, chamber *D*, chamber *E* and passage *21a* to chamber *F*. Do not fill in chamber *F* with the carmine color. Dampen with a brush and let dry.

With an orange pencil, start at the supply-valve seat, filling in chamber *F* and passage *21*. Dampen and let dry. With a yellow pencil, fill in chamber *G*, space around the outside edge of the diaphragm and passage *32*. Dampen and let dry.

D-24-B Feed Valve— Closed Position (Sketch 27)

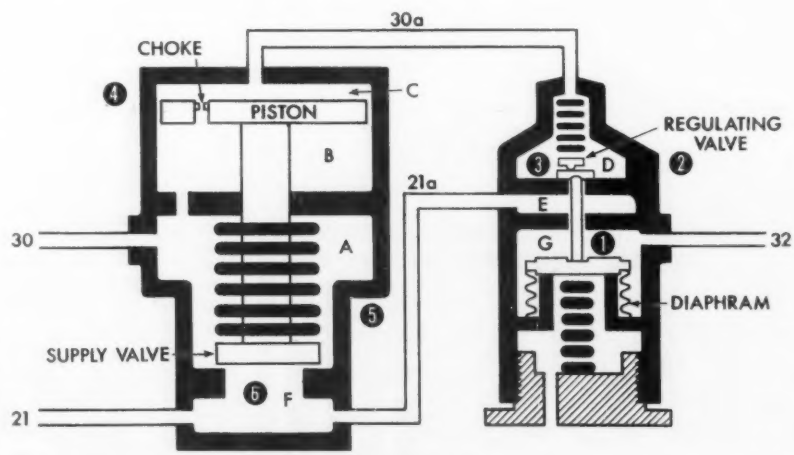
When the delivered air pressure to the brake valve and in chamber *G* becomes greater than the tension of the regulating spring, the diaphragm is moved downward, permitting the regulating valve to be seated by its spring. Thus, air from chambers *C* and *D* to chamber *E* is cut off by the regulating valve and permitted to build up in chamber *C* through the choke in piston from chamber *B*. When the air pressure in chamber *C* is the same as that in chamber *B*, the supply valve spring moves the piston, seating the supply valve and cutting off flow of main reservoir air to chamber *F* and delivery port *21*. The parts of the feed valve will remain in this position until the delivery air pressure in chamber *G* on the diaphragm becomes less than the value of the regulating spring. The feed valve will then open as described under Sketch 26.

To color sketch 27, proceed as follows: With a carmine pencil, color chamber *A*, chamber *B*, chamber *C*, passage *30a* and chamber *D* around the regulating valve. Dampen and let dry. With an orange pencil, color chamber *E*, passage *21a*, chamber *F*, and passage *21*. Dampen and let dry. With a yellow pencil, color the space around diaphragm, chamber *G* and passage *32*. Dampen and let dry.



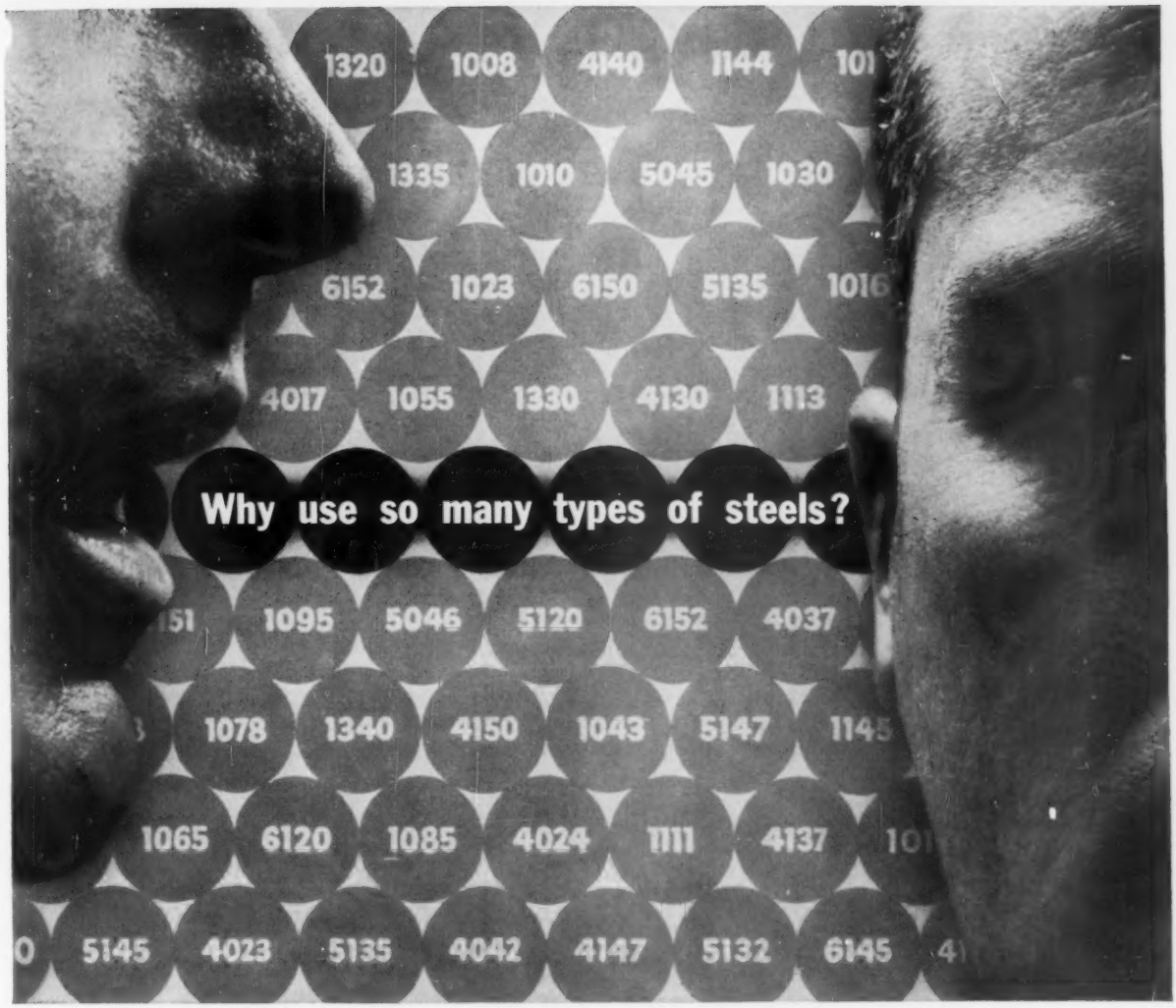
Sketch 26—D 24-B Feed Valve—Open Position

1. Delivered air pressure in chamber G is less than regulating spring tension.
2. Spring moves diaphragm upward, unseating regulating valve.
3. Air flows from chamber D to chamber E and passage 21a.
4. Flow continues to chamber F, to discharge passage 21, to brake valve rotary valve.
5. Due to choke in piston, higher pressure in chamber B forces piston upward.
6. Supply valve is thus moved off its seat, compressing its spring.
7. Main reservoir air flows from passage 30 to chamber A, to chamber F, to passage 21 and brake valve.



Sketch 27—D 24-B Feed Valve—Closed Position

1. Delivered air from passage 32 (brake pipe) becomes greater than tension of regulating spring.
2. Diaphragm is moved downward, permitting regulating valve to close.
3. Air from chambers C and D is cut off from chamber E by regulating valve.
4. Air pressure builds up in chamber C from chamber B through piston choke.
5. When air pressure in chamber C is the same as that in chamber B, supply valve spring moves piston down.
6. Supply valve closes, cutting off flow of main reservoir air to chamber F and delivery post 21.



Just two will do...
4340, 4620 General Purpose Steels

You make your job easier and you standardize, simplify, and save money...

These two General Purpose alloy steels can solve most of your steel selection problems. One a carburizing type . . . the other a through-hardening type — with just these two alloy steels you can satisfy practically all your engineering requirements.

Here's your chance to standardize on materials. To simplify inventory and processing. To save money in purchasing, inventory, production . . .

When you need through-hardening steel, simply specify 4340. It's ideal for parts of any section size. It provides exceptionally high strength and toughness. Responds reliably to heat treatment. It's weldable under proper conditions and machines at relatively high hardness.

And when you want to carburize, simply specify 4620 steel. It resists warpage and distortion in heat treatment. Responds reliably and uniformly, too. Provides a tough, strong core to support the hard wear-resistant case.

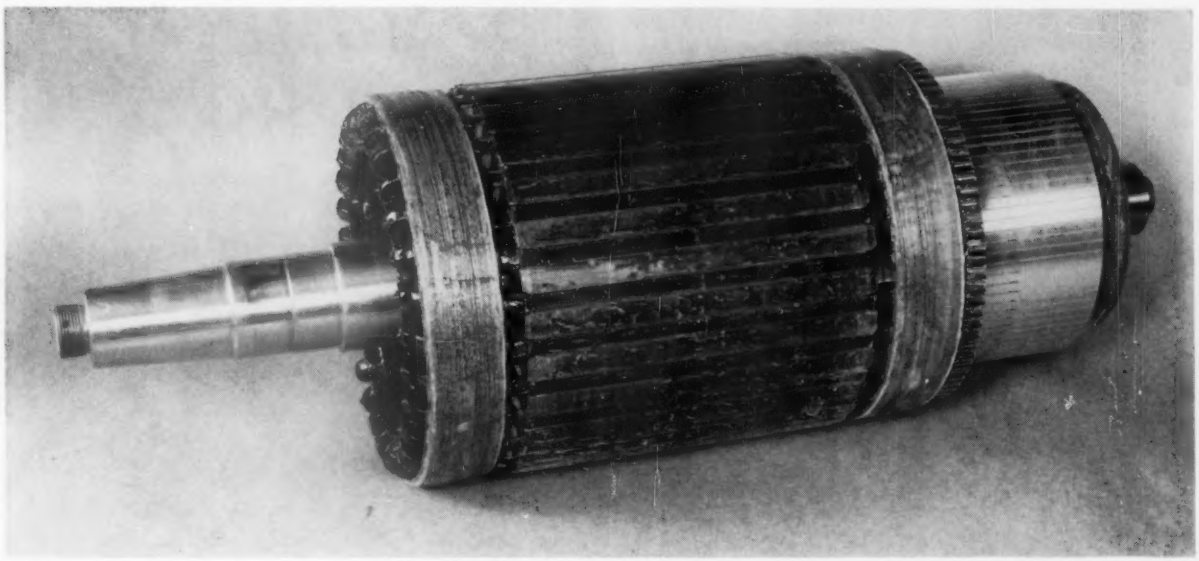
Best of all, both are carried by Steel Service Centers from coast to coast, ready for delivery right off the shelf. If you need heavier-duty or special purpose steels for very particular applications, suitable nickel alloy steels are also available from your Steel Service Center. To get a buyer's guide of centers that carry 4340, 4620, and other nickel-containing grades, simply write Inco.

AMERICAN STEEL WAREHOUSE ASS'N.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK

ELECTRICAL SECTION



Armature for d-c traction motor is less liable to electrical and mechanical damage when its coils are secured with fiber-glass tape bands.

Production and maintenance simplified . . .

Using Glass Bands for Traction Motors

By E. C. Appleby

GLASS BANDING has won wide acceptance for traction-motor service. A glass band properly designed and applied can be made to retain as much tension and to be as strong as a steel band. The glass band is solid and adheres to the coils. It does not bond to them, however, so that it can be removed if necessary. It is economical, reliable, can limit damage from electrical failures, and is safer to apply than wire.

The armature band holding the coils of any high-speed traction motor in place is a major mechanical strength member. In some applications, the band must withstand forces of as much as 7000 times the weight of the coils it supports. In addition to adequate strength, the band must remain tight under the most adverse conditions of temperature and fatigue loading encountered in traction-motor service.

A loose band, which permits coil movement, may lead to an electrical failure which, if undetected, can cause considerable damage and expense. Successful operation of any motor with only routine maintenance during long periods between overhaul depends on careful attention to details, of which the armature band is one of the most important.

The early design of a single-layer, soldered wire band proved inadequate for traction motors. This led to the development of the solderless wire band which utilized two layers of wire with their ends joined together to form an interlocked mechanical joint. With the interlocked joint, wire band strength was no longer limited by the relatively poor physical properties of solder. The solderless wire band was a major development in wire bands and became standard on Westinghouse traction motors in 1952.

The solderless wire band is now being replaced by the glass fiber band, because the glass band has many properties which are ideally suited for the application. The glass band is an insulator and requires no auxiliary insulation. It eliminates both insulation and creepage problems frequently encountered with wire bands.

The glass band has amazing strength with a desirable strength-to-weight ratio. It can be made to grip coils tightly, preventing coil movement during armature rotation. With a lower modulus of elasticity than metal, it has more follow-up to keep the coils tight if insulation shrinkage does occur. The glass band molds itself to the coils so that it adheres tightly and can't slip off, yet it doesn't bond and can readily be removed.

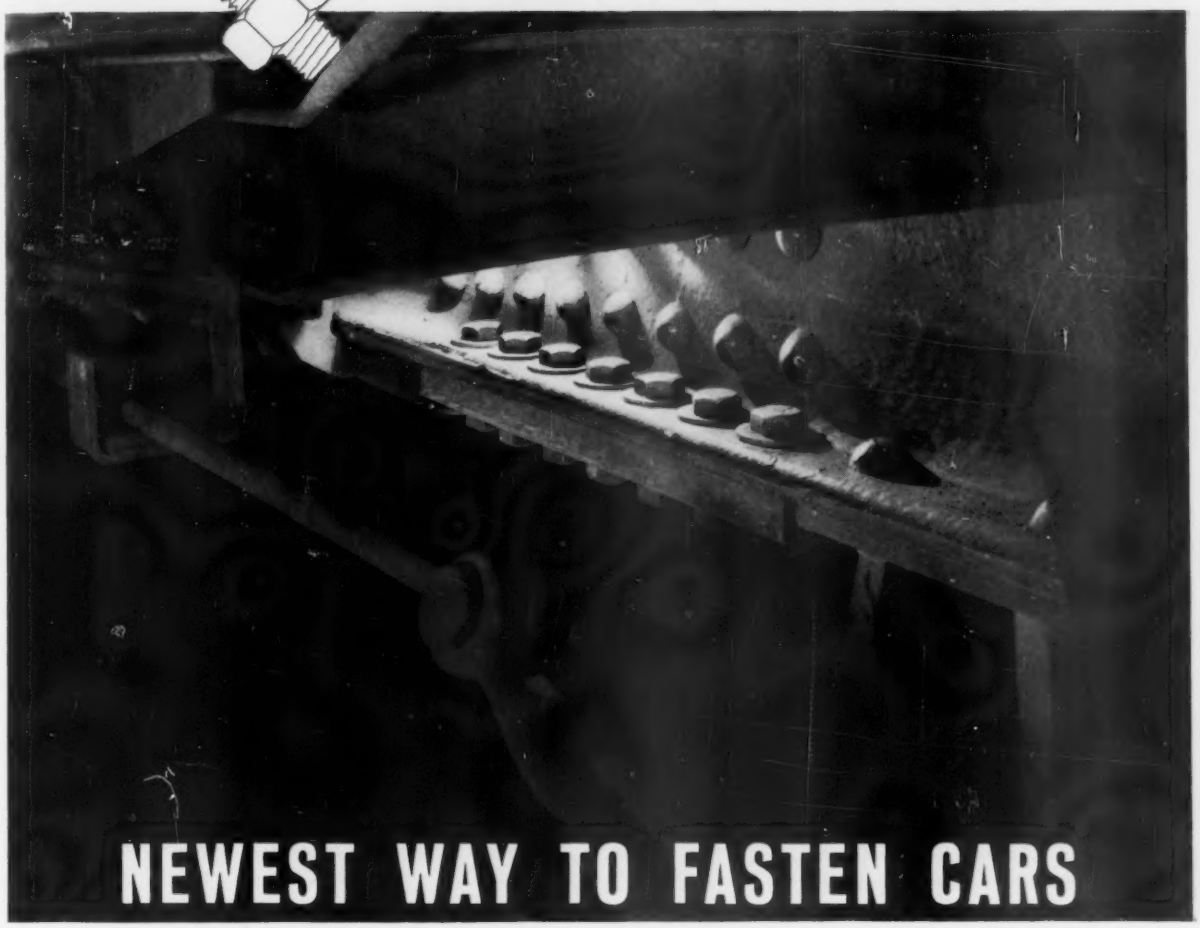
The glass band is economical and, in many cases, is less expensive to apply than wire bands. Workmen prefer

(Continued on page 48)

E. C. Appleby, Rectifier and Traction Equipment Engineering, Westinghouse Electric Corp., East Pittsburgh, Pa.

R B&W high strength bolts...

115th year



NEWEST WAY TO FASTEN CARS

and keep them tight!

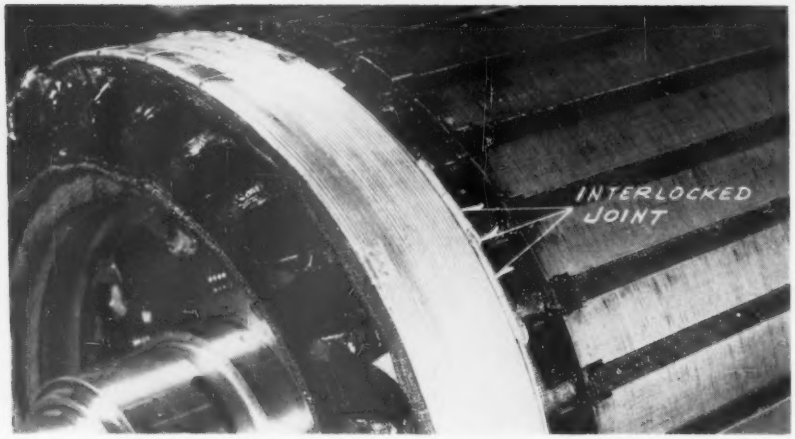
THIS PROVED, SUPERIOR FASTENING METHOD for rolling stock is already cutting maintenance costs and time for a number of leading roads. Used in place of rivets, RB&W High Strength Bolts are assuring more reliable joints for cars even in the severest service. Here's why:

The higher the *clamping force* exerted by fasteners, the stronger the connection becomes. Force from rivets is due to contraction from cooling and is unreliable. Force from bolts is due to wrenching, and is positive and uniform. Actually, high strength bolts clamp structures together with *more than double* the highest force possible with rivets. Experience confirms that such bolts stay tight under the constant vibration and shock loads that so often cause rivets to loosen and fail, and equipment to go back to the shop for repair.

Take full advantage of this new development pioneered by RB&W. You'll benefit too by the recognized quality of RB&W High Strength Bolts. Send for this Bulletin RR-1 which gives full details. Or see catalog 1c/RB&W in the Modern Railroads Catalog File. An RB&W engineer will be happy to discuss this superior fastening method with you. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.



Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.



Solderless wire band developed by Westinghouse in 1952 is now being displaced by glass bands.

Ultimate Tensile Strength of Aged Glass Bands

Aging temperature, Deg C	Aging time, months	Ultimate strength, psi Minimum	Average
.....	0*	160,000**	168,000
130	4	157,500	168,000
130	8	164,000	167,500
150	4	150,000	160,000
150	8	121,500	127,000

*New bands.

**Stress values at 130 deg C, based on glass area only.

(Continued from page 46)

to apply glass tape, because it is safer. Experience has shown the glass band to be reliable. In some cases, glass bands have definitely proved superior to wire bands in limiting damage to motors resulting from electrical failures.

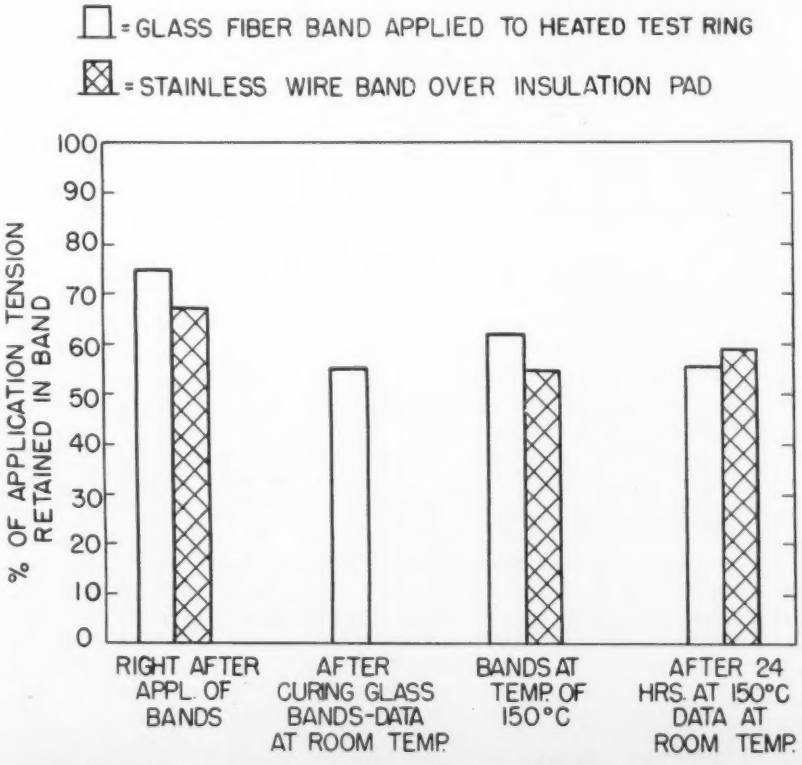
The glass band is formed from glass tape. Tape currently in use has continuous glass-fiber strands placed side by side and is impregnated with a semi-cured polyester resin. This parallel strand arrangement divides tape load equally among many strands, permitting the tape to develop its high strength. The polyester resin, when finally cured, consolidates the glass tape into a solid band. There is no cross weave in present glass banding tape.

Before applying glass bands to Westinghouse traction motors, a test and development program was carried out to evaluate this banding method. Primary interest was centered about the amount of application tension retained in the glass band and the tensile strength after aging. To evaluate aged tensile strength, a series of glass bands were prepared on split discs and aged for eight months. One series was aged at 130 deg C and the other at 150 deg C. An aging cycle involved six days at elevated temperature and one day at room temperature. Bands were then pulled to destruction at the end of one, two, four and eight months. The pull tests were made at 130 deg C. Even after aging for eight months at 150 deg C, glass bands exhibit high strength.

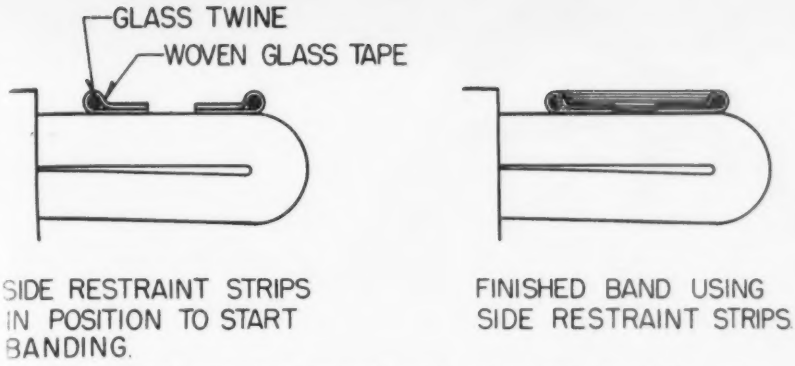
In addition to satisfactory tensile strength, it is important that a band have adequate initial tension. If the turns of tape, after curing, have sufficient tension to pull the coils down against the coil support with a force greater than the force induced in the coils from centrifugal force, the band will hold the coils in place during rotation. By preventing coil movement, failures caused by flexing of coil insulation are prevented or minimized.

A study of tension retained in bands was made by forming bands on thin steel rings which had strain gages mounted in the bores to record tension. Glass bands formed on these slightly flexible test rings were evaluated and compared with wire bands formed on the same rings. With wire bands, the same insulation was placed between the band and test ring that is normally used to insulate wire from the coils. The results of the tests on retained tension showed both the wire and glass bands retained about 60 per cent of their application tension.

The results emphasize the need for maximum permissible tension in the tape after application, because approximately 40 per cent may be lost during curing. A band of 1-in. tape applied at 550 lb tension may have about 330 lb tension per turn after



Tension retained by wire and glass bands on tests rings showed glass to be equivalent.



Side restraint for small quantity production can be achieved with strips of glass tape.

curing. For 1-in. tape applied at 550 lb, the band should be designed to have sufficient turns so that the calculated tension per turn at overspeed should not exceed 330 lb if coil movement is to be prevented. Application at less than 550 lb would require more turns to obtain a correspondingly lower calculated tension per turn at overspeed.

A tension of 550 lb on 1-in. tape corresponds to a stress of 75,000 psi. This stress is based on glass area only, because the resin content of a finished band is usually unknown. The glass content is 0.0074 sq in. per inch width of tape per turn. Glass bands on new traction equipment are designed to be stressed to a calculated value of 45,000 psi at overspeed, which corresponds to 330 lb tension for 1-in tape.

Glass bands are formed by wrapping the glass onto the armatures through a tensioning device. Modification of the standard Westinghouse wire-band tension device to accommodate glass tape works very well. The usual practice is to apply tape at 550 lb tension per inch of tape width, although lower tensions may be required on soft coils or on partially supported coils. A ½-in. wide tape would be applied at 275 lb and a 1-in. width at 550 lb.

It is desirable to use the widest practical tape width in banding armatures. This requires the least number of turns and minimum amount of labor. Tape width is limited by the greater tension required for wider tapes and by non-level coil surfaces which can cause uneven tension and the breaking of strands. A 1-in. tape is the most common.

In maintenance work, it is desirable to be able to determine the number of turns of glass tape required for a wire band which is to be replaced. This can easily be done with the aid of a table which relates glass tape turns to wire turns. The table provides for a glass cross-sectional area equal to twice the wire cross-sectional area. Glass band stress will then be half the wire band stress, usually on the conservative side.

There is usually no space problem in replacing a wire band with a glass band. A glass band can usually be made as wide as the insulation pad under the wire band. Because no auxiliary insulation is required, the glass band occupies space formerly occupied by both insulation and wire. Glass should not extend to the core iron. Clearance will allow insulating resins to penetrate to the coils under the band. The space taken by a glass band can be calculated as 0.0125 sq in. per turn. Allowance should also be made for extra space that becomes available when coils pull down against the coil supports.

Westinghouse traction armatures are preheated before banding. With insulation somewhat softened by heat, coils are easier to pull into place without damage to insulation. It was found by test that the glass applied to preheated armature retains about 8 per cent more turns.

For a motor that has been in service for some time, it is not essential to preheat for glass banding, because coils are in position and are not likely to move during banding.

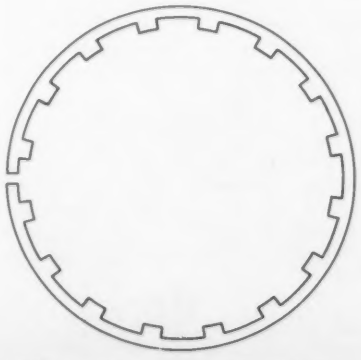
If the amount of tape required is sufficient to build an appreciable band

(Continued on page 52)

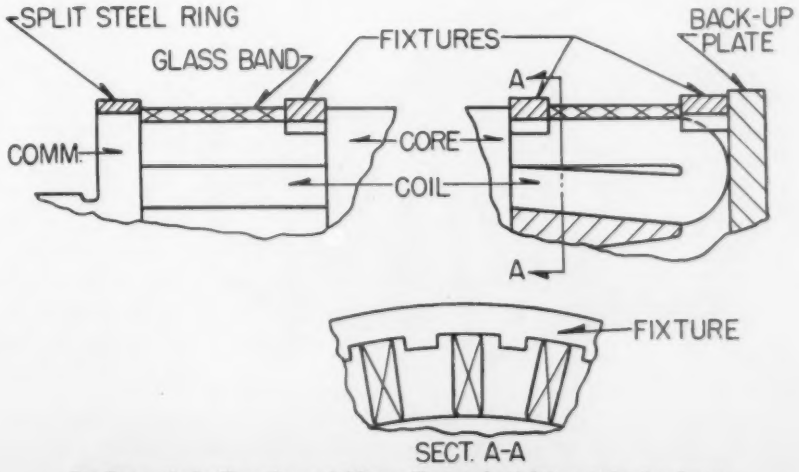
Conversion Factors for Replacing Wire with Glass Tape

(For a given wire diameter and a selected tape with multiple wire turns by factor in table to obtain number of glass tape turns required.)

Wire diameter,	Tape width, in.			
in.	⅜	½	¾	1
.029	0.47	0.36	0.24	0.18
.045	1.16	0.86	0.58	0.43
.057	1.84	1.38	0.92	0.69
.064	2.32	1.74	1.16	0.87
.072	2.94	2.20	1.47	1.10
.081	3.70	2.78	1.85	1.39
.101	5.70	4.28	2.85	2.14



Glass band fixture for quantity production.



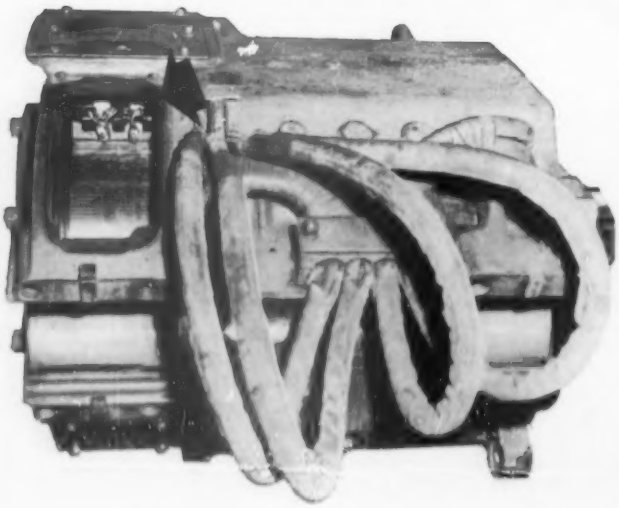
Banding method utilizes the special fixture illustrated at left to restrain glass layers.



"Only one traction motor brush can keep up with the tonnage-train traffic on the L&NE!"

comments Mr. Edward C. Kaiser, Chief Mechanical Officer





"The Lehigh & New England is an all-freight railroad," Mr. Kaiser continues. "Tonnage trains that put peak loads on motive units are the everyday story. Grades as steep as 2.4 and sharp curves mark the contour of the line – a combination that requires lots of dynamic braking.

"When you turn a traction motor into a generator at the operating speeds and loads prevailing on the L&NE, the brushes have to be able to take real punishment."

Experience has taught the L&NE that SPEER Brushes were the only brushes tried by it that could take this treatment – and stand up. "We have used SPEER Traction Motor Brushes (grade E-44) exclusively for over four years on all road units and road and yard switchers." Mr. Kaiser concludes, "It is the only brush that has stood up satisfactorily."

We can't think of a better endorsement for the brushes that have proved themselves in millions of miles of this kind of railroad service. SPEER builds a complete line of high-performance brushes for every railroad application. If you'd like to know more about the important cost savings that are built into all SPEER Brushes, write today for your free copy of the booklet, BRUSHES BY SPEER!

SPEER Carbon Co.



Wrong Axle

By Gordon Taylor

This case shows how important it is for enginemen to furnish accurate information to repairmen.

It all started on a three-unit freight diesel consisting of an A unit, a trailing B unit, and another A unit. This locomotive, operated by Engineer Brown and Fireman Black, was hauling a northbound freight. Everything seemed to be going well until the train stopped at Hillview to set out some cars.

When the train started to leave town, the engineer noticed the wheel-slip light burning and the locomotive seemed to lack power. The engineer called to Black and said: "Something's wrong. Get down on the ground and see if we have any locked wheels when I try starting again."

Black stepped down and started looking over the units. When he reached the second unit, he quickly signaled the engineer to stop. Returning to the cab, the fireman told Brown: "It's the No. 2 pair of wheels on the B unit; they must have just started to slide. There's not much of a flat spot, but they are really locked now."

"Well," replied Brown, "there's nothing that we can do now except to set the B unit in the siding. It's lucky we're someplace that we can leave a unit. You go to the station and phone the dispatcher and get him to connect you with the diesel shop so you can tell them what happened and ask for any special instructions they may have."

When he contacted the diesel shop about 100 miles away, Black told the foreman: "We're stuck at Hillview with a pair of locked wheels on a B unit. We are going to set the unit on the siding, reduce tonnage, and come on in. Do you have any special instructions?"

"Which pair of wheels is locked?" asked the foreman.

"It is the No. 2 pair," replied Black.

The foreman then said: "It looks as though we'll have to send a man with a cutting torch to cut the pinion loose. It's so late this afternoon, that I'll get some men out there in a truck in the morning. When you set the unit in the siding, be sure to drain all the water from the engine cooling system. It is going to turn very cold tonight, and we don't want a frozen engine. Another thing, when you leave the unit, see that the hand brake is set and block the wheels with a piece of wood or board.

"One more thing," added the foreman, "it would be well to mark the locked pair of wheels, or hang a tag on the motor, so there won't be any mistakes."

Early next morning, two machinists with necessary tools and cutting torch went to Hillview with instructions to remove the pinion from the No. 2 pair of wheels. When they arrived at the unit, they could see that the crew certainly had drained the engine. There was ice on the ground and between the rails.

"This is a devil of a spot to work," grumbled Joe Cutter, the torch opera-

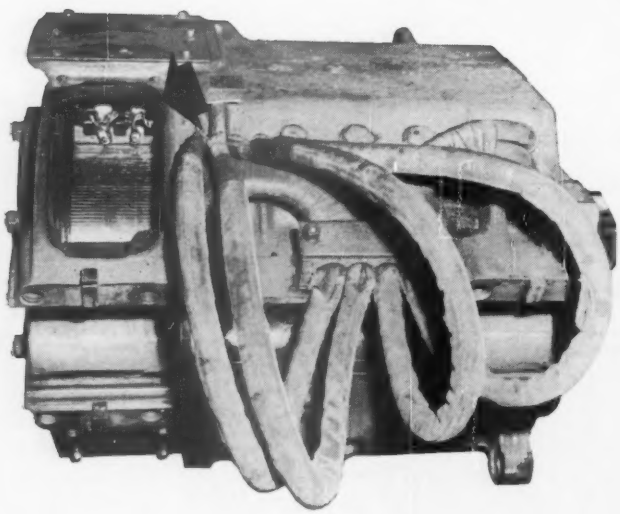
This series of articles is based on actual experiences of men who operate and maintain



"Only one traction motor brush can keep up with the tonnage-train traffic on the L&NE!"

comments Mr. Edward C. Kaiser, Chief Mechanical Officer





"The Lehigh & New England is an all-freight railroad," Mr. Kaiser continues. "Tonnage trains that put peak loads on motive units are the everyday story. Grades as steep as 2.4 and sharp curves mark the contour of the line – a combination that requires lots of dynamic braking.

"When you turn a traction motor into a generator at the operating speeds and loads prevailing on the L&NE, the brushes have to be able to take real punishment."

Experience has taught the L&NE that SPEER Brushes were the only brushes tried by it that could take this treatment—and stand up. "We have used SPEER Traction Motor Brushes (grade E-44) exclusively for over four years on all road units and road and yard switchers." Mr. Kaiser concludes, "It is the only brush that has stood up satisfactorily."

We can't think of a better endorsement for the brushes that have proved themselves in millions of miles of this kind of railroad service. SPEER builds a complete line of high-performance brushes for every railroad application. If you'd like to know more about the important cost savings that are built into all SPEER Brushes, write today for your free copy of the booklet, BRUSHES BY SPEER!

SPEER Carbon Co.
St. Marys, Pa.



Wrong Axle

By Gordon Taylor

This case shows how important it is for enginemen to furnish accurate information to repairmen.

It all started on a three-unit freight diesel consisting of an A unit, a trailing B unit, and another A unit. This locomotive, operated by Engineer Brown and Fireman Black, was hauling a northbound freight. Everything seemed to be going well until the train stopped at Hillview to set out some cars.

When the train started to leave town, the engineer noticed the wheel-slip light burning and the locomotive seemed to lack power. The engineer called to Black and said: "Something's wrong. Get down on the ground and see if we have any locked wheels when I try starting again."

Black stepped down and started looking over the units. When he reached the second unit, he quickly signaled the engineer to stop. Returning to the cab, the fireman told Brown: "It's the No. 2 pair of wheels on the B unit; they must have just started to slide. There's not much of a flat spot, but they are really locked now."

"Well," replied Brown, "there's nothing that we can do now except to set the B unit in the siding. It's lucky we're someplace that we can leave a unit. You go to the station and phone the dispatcher and get him to connect you with the diesel shop so you can tell them what happened and ask for any special instructions they may have."

When he contacted the diesel shop about 100 miles away, Black told the foreman: "We're stuck at Hillview with a pair of locked wheels on a B unit. We are going to set the unit on the siding, reduce tonnage, and come on in. Do you have any special instructions?"

"Which pair of wheels is locked?" asked the foreman.

"It is the No. 2 pair," replied Black.

The foreman then said: "It looks as though we'll have to send a man with a cutting torch to cut the pinion loose. It's so late this afternoon, that I'll get some men out there in a truck in the morning. When you set the unit in the siding, be sure to drain all the water from the engine cooling system. It is going to turn very cold tonight, and we don't want a frozen engine. Another thing, when you leave the unit, see that the hand brake is set and block the wheels with a piece of wood or board.

"One more thing," added the foreman, "it would be well to mark the locked pair of wheels, or hang a tag on the motor, so there won't be any mistakes."

Early next morning, two machinists with necessary tools and cutting torch went to Hillview with instructions to remove the pinion from the No. 2 pair of wheels. When they arrived at the unit, they could see that the crew certainly had drained the engine. There was ice on the ground and between the rails.

"This is a devil of a spot to work," grumbled Joe Cutter, the torch opera-

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

tor. "The Boss said the fireman would tag the locked wheels so there'd be no mistake, but nothing is tagged here."

"My instructions are to cut the pinion from the No. 2 pair of wheels. Now No. 2 would mean the second pair of wheels from the front end, or the end marked "F." It looks to me as though the B unit was coupled with the F end pointing to the rear of the locomotive. If that is the case, the fireman might have counted from the front end of the unit in the direction that the locomotive was moving. In that case, it was really the No. 3 pair of wheels that locked. If I remove the No. 2 pinion. I may be like the dentist that pulled the wrong tooth, except that I would ruin a whole set of teeth. To be safe, we had better start the engine and move the unit to see which pair of wheels is locked."

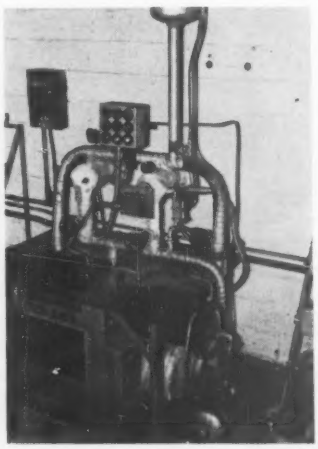
His partner said: "How are you going to operate a B unit that has no controls? Even though we had controls on this unit, we have a drained engine and no water supply handy. We are out of luck until the local comes along and get their locomotive to push the unit to see which wheels are locked."

Fortunately, the local arrived shortly thereafter and, when the dead unit was pushed it was found that the No. 3 pair of wheels was locked. The fireman had, indeed, started counting from the front end of the unit as it was traveling and had given no thought to using the F end as a reference mark.

The diesel locomotive is a very smart animal. It makes no difference to it how its units are coupled together. All units move in the right direction, if the control wiring is in working order. The reason that the locomotive units know which way to move is that their control systems depend on the order in which the F ends are placed in the consist. Consider for a moment two A units coupled back to back. The rear unit must back up to move out with the lead unit when the locomotive moves forward. The control system on the units recognizes that the F ends of the units are pointed in opposite directions and operates the reverser magnet valves accordingly.

If it is important for the control system to check the location of F ends of units, it is equally important for crews and maintainers to use the F end of the unit as a reference mark in reporting location of trouble on trucks and wheels.

Will close this note with the thought if the diesel operators and maintainers are to make a winning team, then, like other teams, they must pass accurate signals to one another.



Temperature controls for Atlantic Coast Line diesels are calibrated and tested on this rack in the electrical department at the ACL Waycross, Ga., shop. It is composed of a centrifugal pump, water tank and heat exchanger. Shop steam through the heat exchanger heats the water to simulate the heating cycle. Vernatherm switch on test is checked with series of pilot lights as each of the six fingers makes contact. A red pilot indicates that the heating cycle is being simulated. When cold water is passed through the heat exchanger, the pilot light goes out and the cooling phase is checked. Actual locomotive conditions are well simulated.

Glass Banding

(Continued from page 49)

thickness, side restraints are necessary to hold the tape in place on the coils until the band is cured. A built-in restraining device for small quantity production can be produced. The first turns of glass tape anchor the side restraints in position. For larger quantity production, a special fixture has been developed. It is made of a flexible material, such as micarta, for easy springing over the coils. The teeth of the fixture fit between the coils and give positive side restraint to the glass band.

Tape is applied directly onto the coils, with lower regions being banded first to level the band. A glass band will usually have a considerable variation in thickness due to coil configuration. Measuring band thickness and width to determine if sufficient tape has been applied is very unreliable, especially if side restraints are used. Extra tape is likely to be applied only to make certain the band is adequate. The amount is best specified by the number of turns. An operator cannot be expected to count turns, so a counter-actuated signal can be used to tell the operator when the band is complete.

Termination of a band applied to a preheated armature is rather simple. After the band is completed, the tension is maintained in the last turn for about 30 sec. Tape tension is then released; the tape severed from the tension device, and the loose end laid flush on the surface.

Tests showed that terminating the band in this manner resulted in a maximum band tension loss of 5 per cent. Loss is low because the wrap-around effect of the glass tape turns combines with the stickiness of the heated polyester resin. Adding 5 per cent more turns to the band can compensate for tension loss. The method of quick-curing a portion of the last turn while under heavy tension can be unsatisfactory. If too short a portion is cured, or if heat is not applied for a sufficient time, the tape slips. To prevent slipping requires effort which cannot be justified by the final result. When overheated, the quick-cured joint is very unsightly.

The finished band is covered with a reusable material, such as silastic, which does not adhere to the band, but produces a smooth finish during curing. The armature is placed in the oven and cured at 135 deg C for 4 hr. After curing, the surface covering and fixtures are removed. Any sharp edges created at the band sides from the cured resin are removed by slightly beveling the sides of the band with a hand file while the armature is in the lathe for commutator turning.

At present, the glass band is limited to Class B temperatures, but it is only a question of time before resins appear that will permit glass bands to be applied in the higher temperature ranges.



PLACES

SECOND ORDER FOR P-S "PACKAGED" BOX CARS

The second order can be the toughest one to land, particularly if the customer bought a load of disappointment along with his first one. Not so with the B&O, their first order gave them conclusive proof of the many values inherent in the purchase of P-S "Packaged" Freight Cars. They saw that the quality of each part—sides, ends, roofs, floors, underframes—was unmatched, thanks to the high standards of mass production used by Pullman-Standard. They discovered, too, that this uncompromising attitude meant each part would fit with a minimum of rework. Deliveries were as scheduled because one source, Pullman-Standard, handled the major components. And cost considerations proved attractive as well.

Your railroad can benefit from these same "Package" car benefits. Call your P-S representative for the details, he will be pleased to meet with you.

PULLMAN-STANDARD

A DIVISION OF PULLMAN INCORPORATED

200 S. MICHIGAN AVE., CHICAGO 4, ILL. • BIRMINGHAM • PITTSBURGH • NEW YORK

J. C. Fennelly Co., San Francisco Representative

Report

(*Continued from page 8*)

York Central and New Haven in 1956 (RL&C, June 1956, page 58).

Information from many sources indicates that the coal-fired gas-turbine locomotive is well beyond the preliminary planning stage. In 1957, we reported that "the Union Pacific has signed an agreement with Alco leading to the design of an actual locomotive" (RL&C, September 1957, page 37). Introduction of this type of prime mover to American railroads would follow 12 years of research and development work.

Leading coal producers and coal-handling railroads formed the Locomotive Development Committee in 1945. With coal costing only one-fourth as much per heat unit as diesel oil, the aim was to utilize it with improved efficiency in locomotives. The gas turbine was determined to be the prime mover with greatest coal-burning potential.

Major problems that had to be solved in developing a coal-fired gas-turbine were coal handling and pulverization, combustion, and fly-ash removal. Components were tested in a pilot plant set up at the Dunkirk, N. Y., facilities of the American Locomotive Co. The program was concluded about two years ago. Recently, the LDC turbine and its auxiliaries have been transferred to the U.S. Bureau of Mines. Work is now being done at Morgantown, W. Va., to determine the feasibility of using this equipment for stationary power generation. (RL&C, April 1959, page 5).

When LDC loaned the turbine to the Bureau of Mines, LDC Chairman Col. R. B. White said that the 4,200-hp plant had been operated more than 5,000 turbine-hours since 1950, and that the work of LDC had been so successful that the Union Pacific planned to build a coal-fired gas-turbine locomotive incorporating designs developed by the Committee.

Miscellaneous Publications

LAWS, RULES, AND INSTRUCTIONS FOR INSPECTION AND TESTING OF LOCOMOTIVES OTHER THAN STEAM, issued by the Bureau of Safety and Service, ICC. Includes revisions as set forth in Ex Parte No. 174.

Superintendent of Documents, Government Printing Office, Washington 25, D.C. Price, $1.



M. B. Crowley



J. G. German

Great Northern



D. F. Marston



R. E. Johnson



L. Z. Daniels

SP&S



L. S. Crane

Southern

Personal Mention

Bessemer & Lake Erie.—*Greenville, Pa.:* A. R. EVANS, traveling engineer, appointed road foreman of engines, succeeding J. S. STULTZ, retired.

Canadian National.—*Battle Creek, Mich.:* JAMES TAGGART appointed assistant general superintendent motive power. Previously senior general foreman, Montreal yard diesel shop.

Central of Georgia.—*Savannah, Ga.:* R. L. GNANN, JR., chief chemist, appointed research and test engineer, mechanical department, succeeding S. L. WALDHOUR, JR., resigned. H. M. MCKAY appointed master mechanic. *Macon, Ga.:* E. T. HARRISON, JR., appointed master mechanic, Macon Division, succeeding Mr. McKay. H. C. DOUTHIT appointed supervisor diesel locomotive operation, succeeding C. H. Carroll. Mr. Douthit previously general foreman, Savannah. *Columbus, Ga.:* C. H. CARROLL appointed master mechanic. *Albany, Ga.:* J. W. MCLEOD appointed assistant general foreman. Formerly assistant general foreman at Savannah.

Chesapeake & Ohio.—*Clifton Forge, Va.:* R. E. TOMLIN appointed road foreman of engines. *Russell, Ky.:* M. E. SANDRIDGE appointed supervisor of diesel operation.

Chicago & North Western.—*Chicago:* RAY A. KENNARD appointed mechanical and air-brake instructor.

Cotton Belt—*Pine Bluff, Ark.:* J. C. RENFROW, JR., appointed mechanical engineer, succeeding S. J. FULLER, retired. Mr. Renfrow formerly electrical engineer.

Delaware & Hudson.—*Albany, N. Y.:* P. E. MCGAUGHAN appointed assistant to superintendent of equipment.

Great Northern. — *St. Paul, Minn.:* M. B. CROWLEY appointed chief mechanical officer. J. G. GERMAN appointed superintendent motive power, succeeding Mr. Crowley. D. F. MARSTON appointed assistant to chief mechanical officer, succeeding Mr. German. R. E. JOHNSON appointed mechanical engineer, succeeding Mr. Marston. Mr. Johnson formerly master mechanic at Great Falls, Mont.

M. B. CROWLEY, chief mechanical officer, born January 24, 1906. In summer of 1919 became hostler helper on the GN at Skykomish, Wash., later serving successively as roundhouse laborer, electrician's helper, and electrician until October 1941 when he was appointed assistant superintendent of electrical operations at Appleyard, Wash. On July 1, 1942, became traveling engineer, Kalispell division, at Hillyard, Wash.; on December 16, 1943, traveling engineer at Shelby, Mont.; on July 15, 1946, diesel superintendent at Shelby; on December 1, 1946, diesel supervisor at Seattle, Wash.; on January 1, 1957, master mechanic at Seattle, and on January 1, 1958, superintendent of motive power.

J. G. GERMAN, superintendent of motive power, born on September 22, 1921. A graduate of Case Institute of Technology (B.S. in Mechanical Engineering December 1943). Shortly after graduation became assistant to master mechanic of GN at Hillyard. Subsequently served as traveling engineer at Grand Forks, N.D.; Shelby, Mont., and Hillyard until March 1959 when he was appointed master mechanic, serving successively at Grand Forks, Great Falls, Mont., and Seattle. Became assistant to chief mechanical officer in St. Paul October 28, 1958.

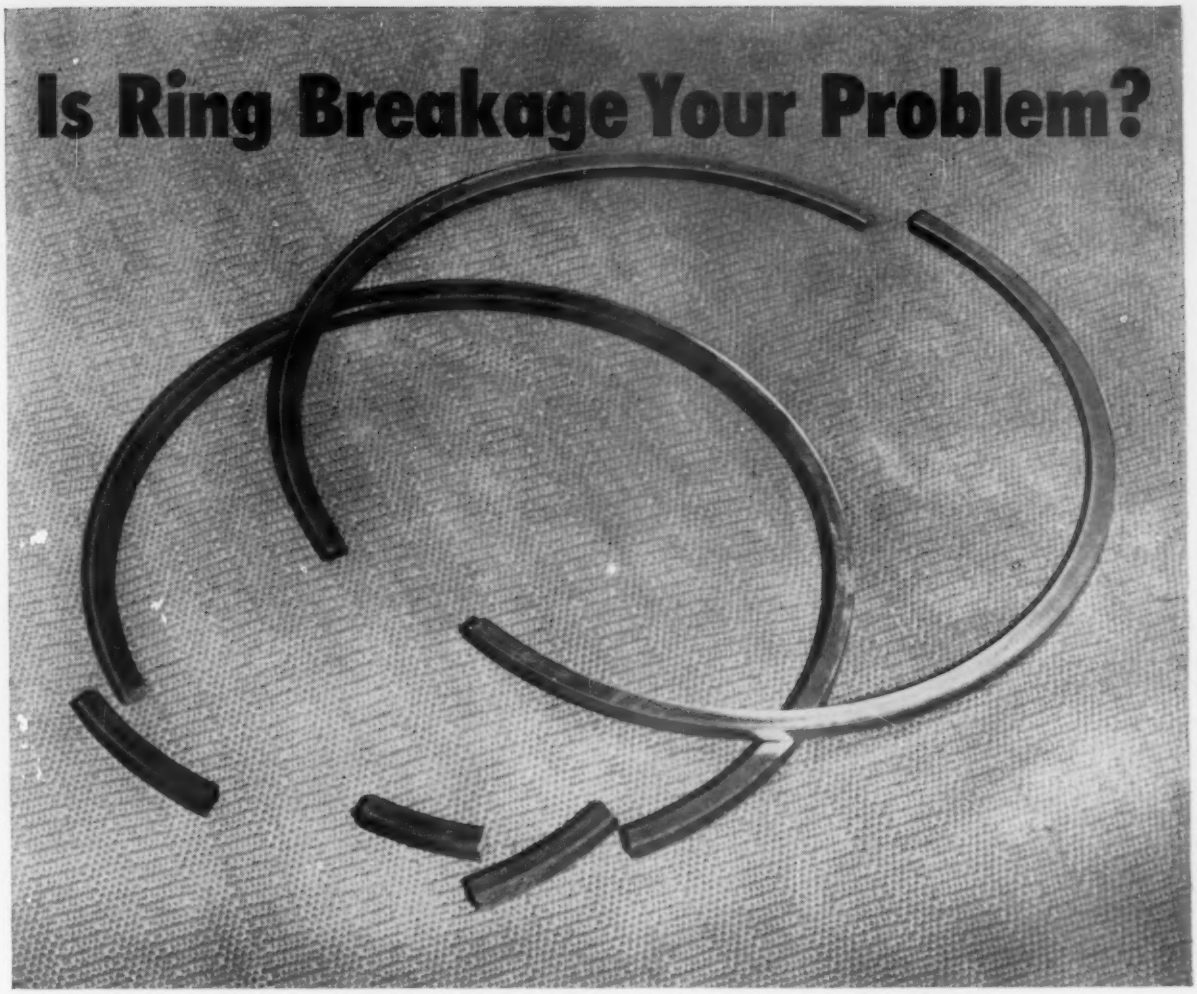
Mexican Ry. — *Apizaco, Tlaxacala, Mex.:* RAFAEL RUIZ appointed system master mechanic, machinery and equipment.

Missouri Pacific. — *St. Louis, Mo.:* W. E. ROBEY appointed electrical engineer-equipment, succeeding A. L. KELLY, retired.

Pennsylvania.—*Williamsport, Pa.:* JAMES F. ROSEMAN appointed master mechanic. Formerly assistant master mechanic at Conway, Pa. *Harrisburg, Pa.:* C. A. KORN appointed master mechanic. Formerly superintendent locomotive equipment at Philadelphia.

(*Turn to page 56*)

Is Ring Breakage Your Problem?



Ring breakage in engines is a real . . . and *costly* problem. It results in:

- **poor performance**
- **costly downtime**
- **increased maintenance expense**
- **subsequent damage to other engine parts.**

To combat this problem, Pedrick developed the remarkable "Excelloy" piston-ring alloy—an amazingly-strong, centrifugally-cast, heat-treated material with a dense, uniform structure. It combines toughness and resiliency with a very high tensile strength and resistance to heat—characteristics essential to avoid ring breakage.

So, no matter what your type of engine or service, ring breakage will be practically eliminated when you use Pedrick rings made of high-strength Excelloy.

Write now for descriptive catalog and prices. Use Pedrick's experienced engineering service for consultation on all your piston-ring problems. Wilkening Manufacturing Co., Philadelphia 42 and Toronto 2.

Pedrick

PISTON RINGS

Our 41st Year of Specialization in the Design and Manufacture of Piston Rings

Santa Fe.—*Chicago*: HAROLD K. LANNING appointed mechanical assistant, succeeding Edgar B. Fields, deceased. MR. LANNING formerly mechanical and research engineer at Topeka, Kan.

Seaboard.—*Hialeah, Fla.*: R. L. HARPER, assistant master mechanic, transferred from Carolina division to North Florida—South division. *Tampa, Fla.*: Jurisdiction of J. M. NIXON, assistant master mechanic, extended over South Florida division.

Southern. — *Washington, D. C.*: LEO S. CRANE, mechanical research engineer, appointed assistant chief mechanical officer. *East St. Louis, Ill.*: THOMAS R. HACKNEY appointed general car foreman. Formerly assistant foreman car repairs at Birmingham, Ala.

LEO S. CRANE, assistant chief mechanical officer, born September 7, 1915. Graduate of George Washington University (B.S.E. 1937). Entered service of Southern in 1937 as laboratory assistant at Alexandria, Va. Subsequently chemist, material inspector, assistant chief material inspector, assistant engineer of tests, engineer of tests, and mechanical research engineer.

Southern Pacific.—*Los Angeles:* T. J. MCDONALD appointed assistant master mechanic, Los Angeles division.

Spokane, Portland & Seattle. — *Vancouver, Wash.*: L. Z. DANIELS, master mechanic, appointed general mechanical superintendent, succeeding D. J. RITCHIE, general superintendent motive power, retired.

Mr. Daniels began as a laborer on SP&S at Vancouver in April 1940. Subsequently hostler helper, fireman, engineman, traveling engineer, and assistant master mechanic. Became master mechanic in September 1953 and general mechanical superintendent in September 1959.

Staten Island Rapid Transit.—*Clifton, Staten Island, N. Y.*: J. C. SHEWBRIDGE appointed master mechanic.

Western Pacific.—*Sacramento, Cal.*: R. L. ACKERET, district car foreman, appointed general car supervisor, succeeding G. M. MIDDLETON, retired.

Supply Trade Notes



Max Ephraim, Jr.



H. L. Smith, Jr.

Electro-Motive Division



R. G. Bielenberg
Nalco Chemical

GENERAL MOTORS CORP., ELECTRO-MOTIVE DIV.—*Max Ephraim, Jr.*, appointed assistant chief engineer in charge of electrical, mechanical and locomotive design groups. *H. L. Smith, Jr.*, succeeds Mr. Ephraim as locomotive section engineer. *Howard S. Browning*, district engineer, appointed district sales engineer, San Francisco, Cal., region. *Robert D. Innes*, assistant director of public relations, appointed director of public relations, succeeding Volney B. Fowler, deceased.

■

GENERAL MILLS, INC.; MAGNAFLUX CORP.—General Mills has acquired business and assets of Magnaflux of Chicago, which will operate as a wholly-owned subsidiary. *R. A. Wilson*, General Mills vice-president and general manager of mechanical division, named president of Magnaflux, succeeding *F. B. Doane*, retired.

■

PANTASOTE CO.—Pantasote has ceased supplying window shades, vestibule curtain materials, and imitation leather upholstery fabrics to expand its facilities for producing vinyl sheetings and vinyl resins.

■

UNITED STATES STEEL CORP.—*Leslie B. Worthington* elected president and chief administrative officer. Mr.Worthington previously president of Columbia-Geneva Steel Division of U. S. Steel.

■

ALCO PRODUCTS, INC. — Construction of new wire-spring production facilities started at Chicago Heights, Ill.

■

ACF INDUSTRIES, INC., AMERICAN CAR & FOUNDRY DIV.—*V. R. Linaberry* appointed works manager, Milton, Pa., plant. *C. E. Reedy*, production manager, succeeds Mr. Linaberry as assistant works manager.

■

SPRING PACKING CORP.—*Thomas L. Andersen* appointed assistant sales manager.

■

DUFF-NORTON CO. — Plans are under way for the construction of a new plant at Charlotte, N. C., to permit expansion of the *Duff-Norton Jack Division* and the *Coffing Hoist Division*, each of which will be transferred from their present locations at Pittsburgh, Pa., and Danville, Ill., respectively. Completion of new plant expected in mid-1960.

■

STRAN-STEEL CORP. — *Fred M. Groff* appointed assistant district manager, assisting *E. W. Fitzgerald*, district manager, at Chicago.

■

PITTSBURGH COKE & CHEMICAL CO. —*William T. McLaughlin*, marketing manager, Protective Coatings Division, appointed field sales manager of division.

■

STANDARD RAILWAY EQUIPMENT MANUFACTURING CO. — Construction of a plastics laboratory expected to be completed at Hammond, Ind., this month. An experimental plastic freight-car roof panel now being field tested.

■

STANDARD CAR TRUCK CO. — First Standard Car Truck branch office coordinating activities in northeastern United States established in Suburban Station Building, Philadelphia. *L. W. Metzger*, assistant vice-president—sales, Philadelphia area, for past several years, now in charge of new Eastern sales office, assisted by *Franklin D. Barber, Jr.*, assistant manager of sales. Mr. Metzger formerly vice-president of Baldwin Locomotive Works.

NALCO CHEMICAL CO. — *Robert G. Bielenberg*, assistant vice-president, appointed manager, transportation division, at Chicago. *James E. Starry* appointed district manager, Texas district, at Houston.

■

OAKITE PRODUCTS, Inc.—*T. A. Rohlfsen* appointed manager, South Pacific Coast division, Los Angeles, succeeding *J. C. Leonard*, retired. Mr. Rohlfsen formerly technical service representative.

■

ARCHER-DANIELS-MIDLAND CO. — *Rollin B. Burton, Jr.*, appointed sales representative for Freight Liner System to eastern and southeastern railroads. Headquarters, 1600 Transportation Bldg., 225 Broadway, New York 7.

■

MONTREAL LOCOMOTIVE WORKS.— *William F. Lewis* appointed vice-president at Montreal. Formerly vice-president of marketing, Alco Products, Inc., New York.

■

CRUCIBLE STEEL CO. OF AMERICA. *John A. Wagg* appointed sales manager, Spring Division, at Pittsburgh.

■

INTERNATIONAL-STANLEY CORP.— The *Stanley Works* of New Britain, Conn., and *International Paper Co.*, have formed jointly owned International-Stanley Corp. to produce and sell paperboard freight-car grain doors previously manufactured for Ford Grain Door Co.

Orders and Inquiries for New Equipment

(Placed since closing of November issue)

Locomotives

MISSOURI PACIFIC. *Alco Products.* 12 1,800-hp diesel-electrics. Total cost, about $1,666,000. Trucks and traction motors to be salvaged from 12 existing 1,500 hp units which new locomotives will replace.

Freight Cars

AMERICAN REFRIGERATOR TRANSIT. *Pacific Car & Foundry:* 150 50-ft, 70-ton Class RB insulated reefers, with DF loaders. Approx. unit cost, $17,700. 50 50-ft, 70-ton Class RP mechanical reefers. Approx. unit cost, $27,000. May deliveries.

FRISCO. *Pullman-Standard.* 100 70-ton, PS-2 covered hopper cars, equipped with roller bearings. Delivered from lot of 300 standardized covered hoppers P-S is building for stock at Butler, Pa., plant. Cost of 100 cars, approx. $1,024,000.

GREEN BAY & WESTERN. *Thrall Car.* 2 caboose shells, for construction and outfitting at Green Bay, Wis., shops.

ILLINOIS CENTRAL. *General American.* 30 70-ton Dry-Flo covered hoppers. Approx. cost, $348,000.

NORTH AMERICAN CAR. *American Car & Foundry.* 100 85-ft piggyback flat. *General American.* 10 85-ft G-85 piggyback flat. Cost 110 cars, approx. $1,650,000.

NORTHERN PACIFIC. *General American.* 50 85-ft piggyback flat. These in addition to 25 ordered from General American as reported in October issue.

ROCK ISLAND. *Pullman-Standard.* 500 50-ton PS-1 box cars. Includes 300 40½-ft cars with 8-ft doors; 100 50½-ft cars with 9-ft doors. 100 70-ton, 85-ft piggyback flat cars, equipped with two Rock Island trailer hitches per car.

WESTERN PACIFIC. *Pacific Car & Foundry.* 50 50-ft, 70-ton insulated box cars, equipped with damage-prevention devices.

Notes and Inquiries

Great Northern directors have authorized acquisition of 1,160 new cars in 1960. Included for GN are 750 wide-door box cars; 100 open-top hopper cars; 75 covered hopper cars; 25 gondola cars, and 10 flat cars. Western Fruit Express, a GN subsidiary, will acquire 200 70-ton insulated box cars with special load securing devices. GN will also apply steel siding to 1,000 existing box cars and convert 250 existing freight cars to live-stock cars.

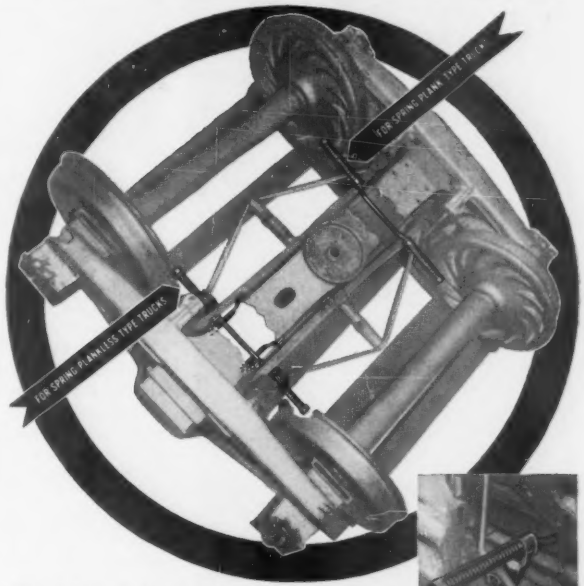
New Haven. New Haven stockholders have approved pledging collateral for $15,896,000 in compliance with ICC conditions for a federal guaranty of financing for 30 EMD FL-9 locomotives. (These in addition to 30 described p 39, March 1958 RL&C.) The newest locomotives will make it possible for the road to retire all of its straight electric locomotives, except the 10 GE ignitron rectifier units most recently acquired.

Pacific Fruit Express has ordered refrigeration systems for 1,000 new cars from the Trane Co. Refrigeration units will maintain constant temperatures ranging from 0 to 70 deg.

Serviceable Fleet of Freight Cars

The serviceable fleet of freight cars on Class I railroads is now down to about 1,550,000 cars—the lowest point in 18½ years. It is down some 40,000 cars from a year ago. Latest AAR figures also show that September brought a net loss in ownership of 6,510 cars. Although 2,135 new and 785 rebuilt cars were placed in service, the month's retirements totaled 9,430 cars.

THE IMPROVED
GRIPCO
BRAKE BEAM SAFETY SUPPORT



SPRING-PLANK TYPE

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.

ENGINEERING IMPROVEMENTS

1. One design fits both 5'-6" and 5'-8" wheel base trucks.
2. One rod length and one spring length. One interchangeable casting fits both spring plank and spring plankless trucks.
3. Ideal for interchange repairs. New design permits easy and fast applications under all conditions. Nuts need not be removed to apply or remove the support.


SPRING-PLANKLESS TYPE
(Safety Loops Included)

OUTSTANDING FEATURES

1. An inexpensive trouble-free support for Rebuilt Car Programs.
2. Designed for spring plank and spring plankless trucks. Spring plankless trucks require safety loops which can be bolted, riveted or welded to the bolster.
3. Supports the brake beam in the event of brake beam or hanger failure.
4. Holds brake beam in horizontal position.
5. Holds brake shoe in proper position in relation to the periphery of the wheel.
6. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
7. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
8. GRIPCO supports can be removed and reapplied without removing nuts; therefore nuts are furnished in proper position.
9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
10. Can replace as a billable repair any support except A.A.R. recommended practice (angle-riveted and welded).

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

OTHER GRIP NUT PRODUCTS AD NO. 110


Grip Lock Nut #1 Grip Holding Nut #2 Railroad Gripco Lock Nut #3

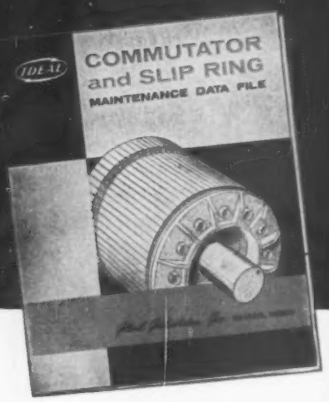
GRIP NUT COMPANY
Serving American Railroads Since 1904
106 BROAD ST., • SOUTH WHITLEY, IND.

FREE

NEW SERIES

HOW-TO-DO-IT ARTICLES

on Commutator and Slip Ring Maintenance



Years of experience are packed into this new 6-article series — each an invaluable guide for keeping commutators and slip rings at peak performance.

Each article discusses a major part of the overall problem — gives practical tips on maintenance — tells how to solve common problems — what to do and how to do it — in easily read shop language. Supplied in attractive folder, forming complete maintenance data file.

Designed as useful refresher reading and trouble shooting guidance for the veteran maintenance man . . . and a must for the new man just "breaking in" . . . the entire series has been prepared in close consultation with leading, nation-wide engineering authorities.

Mail the coupon for Article No. 1 now. Don't miss it — the remainder of the series will be sent to you at regular intervals, free and without obligation.

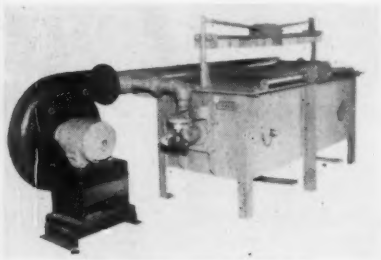
IDEAL Preventive Maintenance
Everything in equipment and methods for Commutator and Slip Ring Maintenance.

IDEAL INDUSTRIES
1563-L Park Avenue, Sycamore, Illinois
Please send free folder and article No. 1 of series "Commutator and Slip Ring Maintenance."

Name_____
Company_____
Address_____
City_____ Zone____ State_____

What's New

(*Continued from page 10*)



Blacksmith Forge

The improved Model 100 double open-top gas-fired blacksmith forge for simultaneous forging and welding of bars, rods and shapes is designed to replace coal-fired forges in railroad shops. It is fueled either with propane or natural gas, and comes up to full working heat quickly without extra preparation. The double-top arrangement permits having forging fire adjacent to the welding fire. Each top has a swinging arch which permits building of heat chambers with loose brick to accommodate a wide variety of shapes and sizes of work. An auxiliary air connection at bottom of chamber, which creates a center of combustion higher up in the flue, selects and holds any type of flame at temperatures up to 2,300 deg F.

The forge is equipped with a 12 oz Mahr 5 hp turbo blower delivering air at 875 cfm. Each side has an air curtain and individual blast gate to allow use of either end of forge alone. Scale and slag accumulations drop into a clean-out box under combustion chamber and are removed through slide openings at the bottom. Shipping weight is 4,540 lb. *Mahr Manufacturing Co., Dept. RLC, 128 Monk ave., Hopkins, Minn.*



Manual Slack Adjuster

This manual slack adjuster is a telescoping push-rod which, it is said, requires no welding or riveting. It can be installed in approximately 3 min. by one man who takes out cotter key and pin, removes standard push rod, inserts new slack adjuster, and replaces the pin and cotter key. It adjusts both trucks simultaneously from 12 to 7 in. in less than a minute from side of car. The device has only six parts, each of which can be renewed separately. It is cadmium dichromate plated to prevent cor-

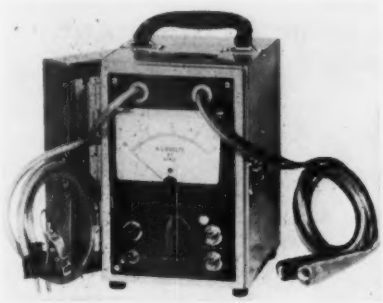


"EXTRA" METAL AT CRITICAL POINTS IDENTIFY FLANNERY BRAKE BEAM HANGERS

Flannery provides additional metal at points where most wear occurs to upgrade operational safety and extend brake service life. Even after heavy use, a greater amount of cross-sectional metal remains on Flannery units than on most conventional AAR-approved brake beam hangers. Carefully selected steel, heat treated at controlled temperatures, assure maximum service life. "U" type Flannery hangers available in six to eighteen inch lengths; "Loop" types from eight to fourteen inches. Round and square-head Flannery Brake Pins furnished in any desired length.

FLANNERY PRODUCTS CORPORATION
RAILROAD SPECIALTIES
P. O. BOX 5103, NEWARK 5, N. J., Telephone MArket 3-0333 / PLANT: BAYONNE, N. J.

rosion and uses the self-cleaning Acme type thread. *Spring Packing Corp., Dept. RLC, 332 S. Michigan ave., Chicago 4.*



Portable Insulation Breakdown Testers

Portable insulation breakdown testers featuring an automatic "squawker" that sounds at preset leakage current values have been added to the Hypot Jr. line of dielectric strength testers. When preset leakage-current limits have been reached, the squawker gives an audible signal, thus enabling production and maintenance testers of electrical equipment to work at a distance from the test set. The Series 4003 squawker models are also equipped with the adjustable limit, visual leakage current indicator.

Models with the squawker audible indicator are available with a-c test potential output up to 6,000 volts. The visual and audible leakage indicators have an adjustment range from 300 microamperes to 3 milliamperes as standard, and to 10 milliamperes on special order. *Associated Research, Inc., Dept. RLC, 3777 W. Belmont ave., Chicago 18.*

BALDWIN
Model 608SC and
V.O. Diesel Engine
EMERGENCY SPARE PARTS
A. G. SCHOONMAKER Company, Inc.
Foot of Spring St., Sausalito, Calif. Edgwater 2-1490
50 Church St., New York 7, N. Y. Digby 9-4350

12 ONLY! NEW, UNUSED
CYLINDER LINERS
for 12-567A Diesel Engine
Part #8048874
BEARINGS
NEW UNUSED
10 sets • GE Cat. #272489-G-2
A. G. SCHOONMAKER Company, Inc.
Foot of Spring St., Sausalito, Calif. Edgwater 2-1490
50 Church St., New York 7, N. Y. Digby 9-4350

DEADLINE
DECEMBER 31, 1959
NO LATER THAN THIS,
CAB VENTILATORS
Patent Applied For

MUST BE INSTALLED IN ONE-THIRD OF ALL DIESEL LOCOMOTIVES

NOW IN SERVICE.
IT IS TO YOUR ADVANTAGE FOR THESE CAB VENTILATORS TO BE REASONABLY PRICED $, AND EASILY INSTALLED. THIS NEW TPC MODEL 86040 IX, 3 POSITION VENTILATOR IS A ONE UNIT CONSTRUCTION, AND DOES NOT HAVE SLEEVES, OR OTHER COSTLY INSTALLATION FEATURES. THIS UNIT WILL FIT ANY CAB CONTOUR WITH

NO INSIDE PROTRUSIONS.
INFORMATION ON REQUEST

TRANSPORT PRODUCTS CORPORATION
3008 MAGAZINE ST. • LOUISVILLE, KY.



A century of experience in custom-building

WINDOWS, CURTAINS, HARDWARE, LAMPS, LOCKS AND OTHER PRODUCTS FOR THE TRANSPORTATION INDUSTRY



Call on Adlake, too, for engineering help in design and cost estimates of new equipment, No obligation.

THE ADAMS & WESTLAKE COMPANY

Factory & General Offices, Elkhart, Indiana, Phone JAckson 2-0550.

Chicago Sales Office, 135 S. LaSalle St., Phone FInancial 6-6232.

New York Sales Office, 50 Church Street, Phone COurtland 7-0073.

Adlake
THE ADAMS & WESTLAKE CO.



These three locomotives—Southern Pacific, Union Pacific and Santa Fe—are equipped with safe, sure, dependable Air-Push Windshield Wiping Equipment, as are 95% of all modern diesel locomotives. Designed for heavy duty, all-weather service with minimum maintenance.

...all equipped with SPRAGUE *Air-Push* Windshield Wipers!

Air-Push Jumbo Rotary Seal Windshield Wiper Motor—"standard" of the Industry.



SAFETY STARTS WITH SEEING!

Sprague DEVICES, INC.
MICHIGAN CITY, INDIANA

ADVERTISERS IN THIS ISSUE

Adams & Westlake Company . . . 60
Armco Steel Corp. 24
Callaway Mills, Inc. 4
Chicago Printed String Co. 11
Electro-Motive Division of GM Corp. 31
Esso Standard Oil Company 29
Flannery Products Corp. 58
General Electric Company 16
Grip-Nut Company 57
Ideal Industries, Inc. 58
International Nickel Company . . 45
International-Stanley Corp. . . . . Inside Back Cover
Johns-Manville Corp. 12-13
Lix Corp. 14
MacLean-Fogg Lock Nut Company 6
Magnus Metal Corp. 26-27
Miner Co., Inc., W. H. . . . . Inside Front Cover
National Carbon Company 9
National Electric Coil Division of McGraw-Edison 3
National Malleable & Steel Castings Company 23
Pullman-Standard Car Manufacturing Company 53
Railroad Friction Products Corp. 12-13
Russell, Burdsall & Ward Bolt Nut Company 47
Schoonmaker Co., Inc., A. G. . . . 59
Sinclair Refining Company . . 36-37
Socony Mobil Oil Company 39
Speer Carbon Company 50
Sprague Devices, Inc. 60
Timken Roller Bearing Company 7
Transport Products Corp. 59
Turco Products, Inc. . . . Back Cover
Westinghouse Air Brake Company 12-13
Wilkening Manufacturing Company 55
Wine Railway Appliance Company 32-33
Wix Corp. 35

executive excitement



Steel-Corr **THE SILVER LINING TO THE FREIGHT CAR SHORTAGE PROBLEM**

STEEL CORR

INTERNATIONAL-STANLEY CORPORATION
(formerly Ford Carliner Division)
116 NORTH 40TH STREET • OMAHA 31, NEBRASKA

TURCO FERREX B



Plenty "sweet" at six ounces per gallon... That's what sixteen of America's leading railroads have reported during the past year by their repeat orders of Turco Ferrex B.

If your road is not now using this exceptionally efficient and long-lived hot tank compound for the cleaning of steel diesel parts, it will pay you to investigate Ferrex B. You will find this time-tested Turco product more efficient...even though it requires no additions and is used at concentrations up to 50% **lower** than those required by ordinary hot tank cleaners.

Ferrex B is but one of more than a hundred cleaning compounds developed by Turco research specifically for railroad cleaning.

TURCO PRODUCTS, INC.

Railroad Division

Chemical Processing Compounds

24600 South Main Street, Wilmington, California

Factories: Newark, Chicago, Houston, Los Angeles, London, Rotterdam, Sydney, Mexico City, Paris, Hamburg, Montreal, Manila, Naha (Okinawa)

Manufactured in Canada by B. W. Deane & Co., Montreal

Offices in all principal Cities

